☒ **Synthetic Minor Determination and/or** ☐ **Netting Determination**

Permit To Install **14-05571**

A. Emission Unit Description

Sumitomo Sitix has applied for a Permit to Install for an 51 epitaxial reactors with wet scrubber. These emissions units (P024 - P074) produce epitaxial silicon wafers.

B. Facility Emissions and Attainment Status

Hydrochloric acid (HCl) emissions, as an acid mist, will occur in small quantities from these controlled emissions units. HCl is classified as a Hazardous Air Pollutant. Warren County is designated as primary non-attainment for ozone and nitrogen oxides.

C. New Source Emissions

The Uncontrolled Potential to Emit (PTE) HCl from P024 - P074 is 203.36 TPY HCl. The uncontrolled PTE of HCl from all emissions units at the facility is 538.28 TPY HCl. The Controlled PTE (allowable) HCl from P024- P074 is 1.02 TPY HCl.

This synthetic minor permit will limit the HAPs emissions from the facility to less than 10 TPY for any single HAP and 25 TPY of combined HAPs, based on rolling, 12-month summation. The facility will maintain records of control device operating parameters and actual HAPs emissions in order to demonstrate compliance.

D. Conclusion

SUMCO USA, Inc. will maintain rolling, 12-month records of the HAPs emissions from the entire facility and submit quarterly reports. The requirements in this federally enforceable PTI will allow the facility to avoid being major for the MACT regulations and the Part 70 Title V permit regulations and also avoid being subject to OAC rule 3745-3-28 which would require SUMCO USA, Inc to submit an MACT determination .

State of Ohio Environmental Protection Agency

RE: DRAFT PERMIT TO INSTALL **CERTIFIED MAIL**
WARREN COUNTY

Street Address: Mailing Address: Lazarus Gov. Center
Lazarus Gov. Center **TELE:** (614) 644-3020 **FAX:** (614) 644-2329

Application No: 14-05571
Fac ID: 1483080196

DATE: 11/4/2004

SUMCO USA
William Romaine
537 Grandin Road
Maineville, OH 450399772

You are hereby notified that the Ohio Environmental Protection Agency has made a draft action recommending that the Director issue a Permit to Install for the air contaminant source(s) [emissions unit(s)] shown on the enclosed draft permit. This draft action is not an authorization to begin construction or modification of your emissions unit(s). The purpose of this draft is to solicit public comments on the proposed installation. A public notice concerning the draft permit will appear in the Ohio EPA Weekly Review and the newspaper in the county where the facility will be located. Public comments will be accepted by the field office within 30 days of the date of publication in the newspaper. Any comments you have on the draft permit should be directed to the appropriate field office within the comment period. A copy of your comments should also be mailed to Robert Hodanbosi, Division of Air Pollution Control, Ohio EPA, P.O. Box 1049, Columbus, OH, 43266-0149.

A Permit to Install may be issued in proposed of final form based on the draft action, any written public comments received within 30 days of the public notice, or record of a public meeting if one is held. You will be notified in writing of a scheduled public meeting. Upon issuance of a final Permit to Install a fee of **$12600** will be due. Please do not submit any payment now.

The Ohio EPA is urging companies to investigate pollution prevention and energy conservation. Not only will this reduce pollution and energy consumption, but it can also save you money. If you would like to learn ways you can save money while protecting the environment, please contact our Office of Pollution Prevention at (614) 644-3469. If you have any questions about this draft permit, please contact the field office where you submitted your application, or Mike Ahern, Field Operations & Permit Section at (614) 644-3631.
Sincerely,

Michael W. Ahern
Michael W. Ahern, Manager
Permit Issuance and Data Management Section
Division of Air Pollution Control

CC: USEPA HCDES Ohio-Kentucky-Indiana Regional Council of Governments KY IN

PUBLIC NOTICE
ISSUANCE OF DRAFT PERMIT TO INSTALL **14-05571** FOR AN AIR CONTAMINANT SOURCE FOR **SUMCO USA**

On 11/4/2004 the Director of the Ohio Environmental Protection Agency issued a draft action of a Permit To Install an air contaminant source for **SUMCO USA**, located at **537 Grandin Road, Maineville**, Ohio.

Installation of the air contaminant source identified below may proceed upon final issuance of Permit To Install 14-05571:

Installation of 51 new epitaxial reactors for the production of epitaxial silicon wafers.

Comments concerning this draft action, or a request for a public meeting, must be sent in writing to the address identified below no later than thirty (30) days from the date this notice is published. All inquiries concerning this draft action may be directed to the contact identified below.

Brad Miller, Hamilton County Department of Environmental Services, 250 William Howart Taft Pkwy, Cincinnati, OH 45219-2660 [(513)946-7777]

DRAFT PERMIT TO INSTALL 14-05571

Application Number:	14-05571
Facility ID:	1483080196
Permit Fee:	**To be entered upon final issuance**
Name of Facility:	SUMCO USA
Person to Contact:	William Romaine
Address:	537 Grandin Road Maineville, OH 450399772

Location of proposed air contaminant source(s) [emissions unit(s)]:
537 Grandin Road
Maineville, Ohio

Description of proposed emissions unit(s):
Installation of 51 new epitaxial reactors for the production of epitaxial silicon wafers.

The above named entity is hereby granted a Permit to Install for the above described emissions unit(s) pursuant to Chapter 3745-31 of the Ohio Administrative Code. Issuance of this permit does not constitute expressed or implied approval or agreement that, if constructed or modified in accordance with the plans included in the application, the above described emissions unit(s) of environmental pollutants will operate in compliance with applicable State and Federal laws and regulations, and does not constitute expressed or implied assurance that if constructed or modified in accordance with those plans and specifications, the above described emissions unit(s) of pollutants will be granted the necessary permits to operate (air) or NPDES permits as applicable.

This permit is granted subject to the conditions attached hereto.

Ohio Environmental Protection Agency

Director

Part I - GENERAL TERMS AND CONDITIONS

A. Permit to Install General Terms and Conditions

1. Compliance Requirements

The emissions unit(s) identified in this Permit to Install shall remain in full compliance with all applicable State laws and regulations and the terms and conditions of this permit.

2. Reporting Requirements

The permittee shall submit required reports in the following manner:

a. Reports of any required monitoring and/or recordkeeping information shall be submitted to the appropriate Ohio EPA District Office or local air agency.

b. Except as otherwise may be provided in the terms and conditions for a specific emissions unit, quarterly written reports of (a) any deviations (excursions) from emission limitations, operational restrictions, and control device operating parameter limitations that have been detected by the testing, monitoring, and recordkeeping requirements specified in this permit, (b) the probable cause of such deviations, and (c) any corrective actions or preventive measures which have been or will be taken, shall be submitted to the appropriate Ohio EPA District Office or local air agency. If no deviations occurred during a calendar quarter, the permittee shall submit a quarterly report, which states that no deviations occurred during that quarter. The reports shall be submitted quarterly, i.e., by January 31, April 30, July 31, and October 31 of each year and shall cover the previous calendar quarters. (These quarterly reports shall exclude deviations resulting from malfunctions reported in accordance with OAC rule 3745-15-06.)

3. Records Retention Requirements

Each record of any monitoring data, testing data, and support information required pursuant to this permit shall be retained for a period of five years from the date the record was created. Support information shall include, but not be limited to, all calibration and maintenance records and all original strip-chart recordings for continuous monitoring instrumentation, and copies of all reports required by this permit. Such records may be maintained in computerized form.

4. Inspections and Information Requests

The Director of the Ohio EPA, or an authorized representative of the Director, may, subject to the safety requirements of the permittee and without undue delay, enter upon the premises of this source at any reasonable time for purposes of making inspections, conducting tests, examining records or reports pertaining to any emission of air contaminants, and determining compliance with any applicable State air pollution laws and regulations and the terms and conditions of this permit. The permittee shall furnish to the Director of the Ohio EPA, or an authorized representative of the Director, upon receipt of a written request and within a reasonable time, any

information that may be requested to determine whether cause exists for modifying, reopening or revoking this permit or to determine compliance with this permit. Upon verbal or written request, the permittee shall also furnish to the Director of the Ohio EPA, or an authorized representative of the Director, copies of records required to be kept by this permit.

5. Scheduled Maintenance/Malfunction Reporting

Any scheduled maintenance of air pollution control equipment shall be performed in accordance with paragraph (A) of OAC rule 3745-15-06. The malfunction of any emissions units or any associated air pollution control system(s) shall be reported to the appropriate Ohio EPA District Office or local air agency in accordance with paragraph (B) of OAC rule 3745-15-06. Except as provided in that rule, any scheduled maintenance or malfunction necessitating the shutdown or bypassing of any air pollution control system(s) shall be accompanied by the shutdown of the emissions unit(s) that is (are) served by such control system(s).

6. Permit Transfers

Any transferee of this permit shall assume the responsibilities of the prior permit holder. The appropriate Ohio EPA District Office or local air agency must be notified in writing of any transfer of this permit.

7. Air Pollution Nuisance

The air contaminants emitted by the emissions units covered by this permit shall not cause a public nuisance, in violation of OAC rule 3745-15-07.

8. Termination of Permit to Install

This Permit to Install shall terminate within eighteen months of the effective date of the Permit to Install if the owner or operator has not undertaken a continuing program of installation or modification or has not entered into a binding contractual obligation to undertake and complete within a reasonable time a continuing program of installation or modification. This deadline may be extended by up to 12 months if application is made to the Director within a reasonable time before the termination date and the party shows good cause for any such extension.

9. Construction of New Sources(s)

The proposed emissions unit(s) shall be constructed in strict accordance with the plans and application submitted for this permit to the Director of the Ohio Environmental Protection Agency. There may be no deviation from the approved plans without the express, written approval of the Agency. Any deviations from the approved plans or the above conditions may lead to such sanctions and penalties as provided under Ohio law. Approval of these plans does not constitute an assurance that the proposed facilities will operate in compliance with all Ohio laws and regulations. Additional facilities shall be installed upon orders of the Ohio Environmental Protection Agency if the proposed sources cannot meet the requirements of this permit or cannot meet applicable standards.

If the construction of the proposed emissions unit(s) has already begun or has been completed prior to the date the Director of the Environmental Protection Agency approves the permit application and plans, the approval does not constitute expressed or implied assurance that the proposed facility has been constructed in accordance with the approved plans. The action of beginning and/or completing construction prior to obtaining the Director's approval constitutes a violation of OAC rule 3745-31-02. Furthermore, issuance of the Permit to Install does not constitute an assurance that the proposed source will operate in compliance with all Ohio laws and regulations. Approval of the plans in any case is not to be construed as an approval of the facility as constructed and/or completed. Moreover, issuance of the Permit to Install is not to be construed as a waiver of any rights that the Ohio Environmental Protection Agency (or other persons) may have against the applicant for starting construction prior to the effective date of the permit. Additional facilities shall be installed upon orders of the Ohio Environmental Protection Agency if the proposed facilities cannot meet the requirements of this permit or cannot meet applicable standards.

10. Public Disclosure

The facility is hereby notified that this permit, and all agency records concerning the operation of this permitted source, are subject to public disclosure in accordance with OAC rule 3745-49-03.

11. Applicability

This Permit To Install is applicable only to the emissions unit(s) identified in the Permit To Install. Separate Permit To Install for the installation or modification of any other emissions unit(s) are required for any emissions unit for which a Permit To Install is required.

12. Best Available Technology

As specified in OAC Rule 3745-31-05, all new sources must employ Best Available Technology (BAT). Compliance with the terms and conditions of this permit will fulfill this requirement.

13. Source Operation and Operating Permit Requirements After Completion of Construction

This facility is permitted to operate each source described by this Permit to Install for a period of up to one year from the date the source commenced operation. This permission to operate is granted only if the facility complies with all requirements contained in this permit and all applicable air pollution laws, regulations, and policies. Pursuant to OAC Chapter 3745-35, the permittee shall submit a complete operating permit application within ninety (90) days after commencing operation of the emissions unit(s) covered by this permit.

14. Construction Compliance Certification

The applicant shall provide Ohio EPA with a written certification (see enclosed form) that the facility has been constructed in accordance with the Permit to Install application and the terms and conditions of the Permit to Install. The certification shall be provided to Ohio EPA upon completion of construction but prior to startup of the source.

15. Fees

The permittee shall pay fees to the Director of the Ohio EPA in accordance with ORC section 3745.11 and OAC Chapter 3745-78. The permittee shall pay all applicable Permit to Install fees within 30 days after the issuance of this Permit to Install.

B. Permit to Install Summary of Allowable Emissions

The following information summarizes the total allowable emissions, by pollutant, based on the individual allowable emissions of each air contaminant source identified in this permit.

SUMMARY (for informational purposes only)
TOTAL PERMIT TO INSTALL ALLOWABLE EMISSIONS

Pollutant	Tons Per Year
HCl	1.02

Emissions Unit ID: **P024**

PART II - SPECIAL TERMS AND CONDITIONS FOR SPECIFIC EMISSIONS UNIT(S)

A. Applicable Emissions Limitations and/or Control Requirements

1. The specific operations(s), property, and/or equipment which constitute this emissions unit are listed in the following table along with the applicable rules and/or requirements and with the applicable emissions limitations and/or control measures. Emissions from this unit shall not exceed the listed limitations, and the listed control measures shall be specified in narrative form following the table.

Operations, Property, and/or Equipment	Applicable Rules/Requirements	
P024 - E01 - EpiPro Pancake Reactor; CS-2 - Plant-wide condenser, scrubber, and hydrogen recovery unit	OAC rule 3745-31-05(A)(3)	OAC rule 3745-17-11(B)
	OAC rule 3745-31-05(C) (to avoid being subject to OAC rules 3745-31-28 and Title V permitting requirements)	
	OAC rule 3745-17-07(A)(1)	

Applicable Emissions Limitations/Control Measures
The hydrochloric acid (HCl) emissions shall not exceed 0.009 pound per hour (lb/hr).
The hydrochloric acid (HCl) emissions shall not exceed 0.040 Tons per Year (TPY).
See T&C A.2.c.
The requirements of this rule also include compliance with the requirements of OAC rule 3745-31-05(C) and OAC rule 3745-17-07(A)(1).
See T&C A.2.b.
Visible particulate emissions from any stack associated with emissions unit P024 shall not exceed 20 percent opacity, as a six-minute average, except as specified by rule.
The emission limitation specified by this rule is less stringent than the emission limitation established pursuant to OAC rule 3745-31-05(A)(3).

2. Additional Terms and Conditions

2.a The hourly emission limitations outlined in term A.1. are based upon the emissions unit's potential to emit. Therefore, no hourly records are required to demonstrate compliance

with these limits.

2.b The actual emissions of Hazardous Air Pollutants (HAPs), as identified in Section 112(b) of Title III of the Clean Air Act, from this facility shall not exceed 9.9 TPY for any single HAP and 24.9 TPY for any combination of HAPs. Compliance with the above limitations shall be based on a rolling, 12-month summation. The permittee has existing records to demonstrate compliance with these limits upon issuance of this permit.

2.c Compliance with OAC rule 3745-31-05(A)(3) shall be demonstrated by the use of a wet scrubber, compliance with the HCl emissions limits and compliance with the facility-wide HAPs emissions limits.

B. Operational Restrictions

1. The scrubber water recirculation flow rate shall be continuously maintained at a value of not less than 60 gallons per minute at all times while the emissions unit is in operation.

2. The pH of the scrubbing liquor shall be maintained within the range of 8-13 at all times while the emissions unit is in operation.

C. Monitoring and/or Recordkeeping Requirements

1. The permittee shall properly install, operate and maintain equipment to continuously monitor the scrubber water recirculation flow rate into the scrubber and the pH of the scrubber liquor while the emissions unit is in operation. The monitoring devices and any recorders shall be installed, calibrated, operated and maintained in accordance with the manufacturer's recommendations, instructions and operating manuals.

   The permittee shall collect and record the following information each day:

   a. the scrubber water recirculation flow rate, in gallons per minute, on a once per day basis;

   b. the pH of the scrubber liquor, on a once per day basis; and

   c. the operating times for the capture (collection) system, control device, monitoring equipment, and the associated emissions unit.

2. The permittee shall collect and record the following information each month for the entire facility:

   a. for all epitaxial reactors, the amount of hydrogen chloride (HCl) used (input), in pounds;

b. for all epitaxial reactors, the amount of HCl released from the reaction of trichlorosilane, in pounds;

c. for all epitaxial reactors, the amount of controlled emissions of each HAP, in tons;

d. for all emissions units, the amount of any other material used which contains HAPs, in tons;

e. for all emissions units, the individual HAP content for each HAP of each material used, in percent by weight (ton HAP/ton material);

f. the total individual HAP emissions for each HAP from all materials employed, in tons per month [for each HAP the sum of c. plus (d. times e.)];

g. the total combined HAP emissions from all materials employed, in tons per month (the sum of all HAPs as calculated in f.);

h. the updated rolling, 12-month summation of each individual HAP emissions, in pounds or tons. This shall include the information for the current month and the preceding eleven calender months ; and

i. the updated rolling, 12-month summation of total combined HAP emissions, in pounds or tons. This shall include the information for the current month and the preceding eleven calender months.

* A listing of the HAPs can be found in Section 112(b) of the Clean Air Act or can be obtained by contacting your Hamilton County Department of Environmental Services contact. This information does not have to be kept on a individual emissions unit basis.

3. The permit to install for emissions units P024 - P035 and P051 - P074 was evaluated based on the actual materials (typically coatings and cleanup materials) and the design parameters of the emissions unit's exhaust systems, as specified by the permittee in the permit to install application. The Ohio EPA's "Review of New Sources of Air Toxic Emissions" policy ("Air Toxic Policy") was applied for each pollutant emitted by this emissions unit using data from the permit to install application and the SCREEN 3.0 model (or other Ohio EPA approved model). The predicted 1-hour maximum ground-level concentration from the use of the SCREEN 3.0 model was compared to the Maximum Ground-Level Concentration (MAGLC).

The following summarizes the results of the modeling for the "worst case" pollutant(s):

Pollutant: HCl (CAS 7647-01-0)

TLV (ug/m^3): 2198

Maximum Hourly Emission Rate (lbs/hr): 0.132 lbs/hr HCl, P024 - P035 and P051 - P074, combined

Predicted 1-Hour Maximum Ground-Level Concentration (ug/m^3): 30.68 Ug/m^3, P024 - P035 and P051 - P074, combined

MAGLC (ug/m^3): 52.33

Physical changes to or in the method of operation of the emissions unit after it's installation or modification could affect the parameters used to determine whether or not the "Air Toxics Policy" is satisfied. Consequently, prior to making a change that could impact such parameters, the permittee shall conduct an evaluation to determine that the "Air Toxic Policy" will still be satisfied. If, upon evaluation, the permittee determines that the "Air Toxic Policy" will not be satisfied, the permittee will not make the change. Changes that can affect the parameters used in the "Air Toxic Policy" include the following:

a. changes in the composition of the materials used (typically for coatings or cleanup materials), or the use of new materials, that would result in the emission of a compound with a lower Threshold Limit Value (TLV), as indicated in the most recent version of the handbook entitled "American Conference of Governmental Industrial Hygienists (ACGIH)," than the lowest TLV value previously modeled;

b. changes in the composition of the materials, or use of new materials, that would result in an increase in emissions of any pollutant with a listed TLV that was proposed in the application and modeled; and

c. physical changes to the emissions unit or its exhaust parameters (e.g., increased/decreased exhaust flow, changes in stack height, changes in stack diameter, etc.).

If the permittee determines that the "Air Toxic Policy" will be satisfied for the above changes, the Ohio EPA will not consider the change(s) to be a "modification" under OAC rule 3745-31-01 solely due to the emissions of any type of toxic air contaminant not previously emitted, and a modification of the existing permit to install will not be required, even if the toxic air contaminant emissions are greater than the de minimis level in OAC rule 3745-15-05. If the change(s) is (are) defined as a modification under other provisions of the modification definition, then the permittee shall obtain a final permit to install prior to the change.

The permittee shall collect, record, and retain the following information when it conducts evaluations to determine that the changed emissions unit will satisfy the Air Toxic Policy:"

a. a description of the parameters changed(composition of materials, new pollutants emitted, change in stack/exhaust parameters, etc.);

b. documentation of it's evaluation and determination that the changed emissions unit still satisfies the "Air Toxic Policy"; and

c. when the computer modeling is performed, a copy of the resulting computer model runs that show the results of the application of the "Air Toxic Policy" for the change.

D. Reporting Requirements

1. The permittee shall submit quarterly deviation (excursion) reports to the Hamilton County Department of Environmental Services that identify all periods of time during which the following scrubber parameters were not maintained within the requirements of the Operational Restrictions:

   a. the scrubber water recirculation flow rate; and

   b. the scrubber solution pH.

   If no exceedances occurred during the reporting period then a report is required stating so. These reports shall be submitted by January 31, April 30, July 31, and October 31 of each year and shall cover the previous calendar quarters.

2. The permittee shall notify the Hamilton County Department of Environmental Services of any exceedance of the HAP emissions limitations set forth in term A.2.b. The reports shall be submitted to the Director (the Hamilton County Department of Environmental Services) by January 31, April 30, July 31 and October 31 of each year and shall cover the previous three calendar months (October through December, January through March, April through June and July through September, respectively.)

   If no exceedances occurred, the permittee shall state so in the report.

E. Testing Requirements

1. Emissions Limitations

   The hydrochloric acid (HCl) emissions shall not exceed 0.009 pound per hour (lb/hr)
   The hydrochloric acid (HCl) emissions shall not exceed 0.040 Tons per Year (TPY)

   Applicable Compliance Methods

Compliance with the hourly HCl emissions limitation shall be determined by the following calculations:

a. for the conversion of TCS to HCl in the scrubber:

actual trichlorosilane usage (lbs TCS/hr) x unit conversion trichlorosilane (1 mole TCS/135.4524 gMW TCS) x stoichiometric ratio (3 moles HCl/1 mole TCS) x unit conversion HCl (36.3609 gMW HCL/1 mole HCl) = lbs HCl/hr

b. for the addition of HCl in the hi-etch process:

actual cycle time (min/cycle) x actual production rate (cycles/hr) x actual flow rate (liters HCl/hr) x conversion factor (ft3/28.3168 liters) x conversion factor (1 lb HCl/9.7752 ft3 HCl) = lbs HCl/hr; and

c. (lbs HCl/hr from the conversion of TCS + lbs HCl/hr from the addition of HCl) x scrubber efficiency (1 - 99.5/100) = lbs HCl/hr from the scrubber stack

Compliance with the annual HCl emissions limitation shall be determined by the recordkeeping requirement in T&C C.2.h.

2. Emissions Limitation

Visible particulate emissions from any stack associated with emissions unit P024 shall not exceed 20 percent opacity, as a six-minute average, except as specified by rule

Applicable Compliance Method

Compliance shall be determined in accordance with Test Method 9 as set forth in "Appendix on Test Methods" in 40 CFR, Part 60 ("Standards of Performance for New Stationary Sources"), as such Appendix existed on July 1, 1996.

3. Emissions Limitations

9.9 TPY for any single HAP and 24.9 TPY for any combination of HAPs

Compliance with the HAPs emissions limits outlined in T&C A.2.b. shall be demonstrated by the recordkeeping requirements in T&C C.2.

4. Compliance with the operational restrictions for the wet scrubber in T&Cs B.1. and B.2. shall be demonstrated by the recordkeeping requirements in T&C C.1.

F. Miscellaneous Requirements

1. The following terms and conditions of this permit are federally enforceable: A, B, C.1, C.2, D and E.

PART II - SPECIAL TERMS AND CONDITIONS FOR SPECIFIC EMISSIONS UNIT(S)

A. Applicable Emissions Limitations and/or Control Requirements

1. The specific operations(s), property, and/or equipment which constitute this emissions unit are listed in the following table along with the applicable rules and/or requirements and with the applicable emissions limitations and/or control measures. Emissions from this unit shall not exceed the listed limitations, and the listed control measures shall be specified in narrative form following the table.

Operations, Property, and/or Equipment	Applicable Rules/Requirements	OAC rule 3745-17-11(B)
P025 - E02 - EpiPro Pancake Reactor; CS-2 - Plant-wide condenser, scrubber, and hydrogen recovery unit	OAC rule 3745-31-05(A)(3)	
	OAC rule 3745-31-05(C) (to avoid being subject to OAC rules 3745-31-28 and Title V permitting requirements)	
	OAC rule 3745-17-07(A)(1)	

Applicable Emissions Limitations/Control Measures
The hydrochloric acid (HCl) emissions shall not exceed 0.009 pound per hour (lb/hr).
The hydrochloric acid (HCl) emissions shall not exceed 0.040 Tons per Year (TPY).
See T&C A.2.c.
The requirements of this rule also include compliance with the requirements of OAC rule 3745-31-05(C) and OAC rule 3745-17-07(A)(1).
See T&C A.2.b.
Visible particulate emissions from any stack associated with emissions unit P025 shall not exceed 20 percent opacity, as a six-minute average, except as specified by rule.
The emission limitation specified by this rule is less stringent than the emission limitation established pursuant to OAC rule 3745-31-05(A)(3).

2. Additional Terms and Conditions

2.a The hourly emission limitations outlined in term A.1. are based upon the emissions unit's potential to emit. Therefore, no hourly records are required to demonstrate compliance

with these limits.

2.b The actual emissions of Hazardous Air Pollutants (HAPs), as identified in Section 112(b) of Title III of the Clean Air Act, from this facility shall not exceed 9.9 TPY for any single HAP and 24.9 TPY for any combination of HAPs. Compliance with the above limitations shall be based on a rolling, 12-month summation. The permittee has existing records to demonstrate compliance with these limits upon issuance of this permit.

2.c Compliance with OAC rule 3745-31-05(A)(3) shall be demonstrated by the use of a wet scrubber, compliance with the HCl emissions limits and compliance with the facility-wide HAPs emissions limits.

B. Operational Restrictions

1. The scrubber water recirculation flow rate shall be continuously maintained at a value of not less than 60 gallons per minute at all times while the emissions unit is in operation.

2. The pH of the scrubbing liquor shall be maintained within the range of 8-13 at all times while the emissions unit is in operation.

C. Monitoring and/or Recordkeeping Requirements

1. The permittee shall properly install, operate and maintain equipment to continuously monitor the scrubber water recirculation flow rate into the scrubber and the pH of the scrubber liquor while the emissions unit is in operation. The monitoring devices and any recorders shall be installed, calibrated, operated and maintained in accordance with the manufacturer's recommendations, instructions and operating manuals.

   The permittee shall collect and record the following information each day:

   a. the scrubber water recirculation flow rate, in gallons per minute, on a once per day basis;

   b. the pH of the scrubber liquor, on a once per day basis; and

   c. the operating times for the capture (collection) system, control device, monitoring equipment, and the associated emissions unit.

2. The permittee shall collect and record the following information each month for the entire facility:

   a. for all epitaxial reactors, the amount of hydrogen chloride (HCl) used (input), in pounds;

b. for all epitaxial reactors, the amount of HCl released from the reaction of trichlorosilane, in pounds;

c. for all epitaxial reactors, the amount of controlled emissions of each HAP, in tons;

d. for all emissions units, the amount of any other material used which contains HAPs, in tons;

e. for all emissions units, the individual HAP content for each HAP of each material used, in percent by weight (ton HAP/ton material);

f. the total individual HAP emissions for each HAP from all materials employed, in tons per month [for each HAP the sum of c. plus (d. times e.)];

g. the total combined HAP emissions from all materials employed, in tons per month (the sum of all HAPs as calculated in f.);

h. the updated rolling, 12-month summation of each individual HAP emissions, in pounds or tons. This shall include the information for the current month and the preceding eleven calender months ; and

i. the updated rolling, 12-month summation of total combined HAP emissions, in pounds or tons. This shall include the information for the current month and the preceding eleven calender months.

* A listing of the HAPs can be found in Section 112(b) of the Clean Air Act or can be obtained by contacting your Hamilton County Department of Environmental Services contact. This information does not have to be kept on a individual emissions unit basis.

3. The permit to install for emissions units P024 - P035 and P051 - P074 was evaluated based on the actual materials (typically coatings and cleanup materials) and the design parameters of the emissions unit's exhaust systems, as specified by the permittee in the permit to install application. The Ohio EPA's "Review of New Sources of Air Toxic Emissions" policy ("Air Toxic Policy") was applied for each pollutant emitted by this emissions unit using data from the permit to install application and the SCREEN 3.0 model (or other Ohio EPA approved model). The predicted 1-hour maximum ground-level concentration from the use of the SCREEN 3.0 model was compared to the Maximum Ground-Level Concentration (MAGLC).

Emissions Unit ID: **P025**

The following summarizes the results of the modeling for the "worst case" pollutant(s):

Pollutant: HCl (CAS 7647-01-0)

TLV (ug/m^3): 2198

Maximum Hourly Emission Rate (lbs/hr): 0.132 lbs/hr HCl, P024 - P035 and P051 - P074, combined

Predicted 1-Hour Maximum Ground-Level Concentration (ug/m^3): 30.68 Ug/m^3, P024 - P035 and P051 - P074, combined

MAGLC (ug/m^3): 52.33

Physical changes to or in the method of operation of the emissions unit after it's installation or modification could affect the parameters used to determine whether or not the "Air Toxics Policy" is satisfied. Consequently, prior to making a change that could impact such parameters, the permittee shall conduct an evaluation to determine that the "Air Toxic Policy" will still be satisfied. If, upon evaluation, the permittee determines that the "Air Toxic Policy" will not be satisfied, the permittee will not make the change. Changes that can affect the parameters used in the "Air Toxic Policy" include the following:

a. changes in the composition of the materials used (typically for coatings or cleanup materials), or the use of new materials, that would result in the emission of a compound with a lower Threshold Limit Value (TLV), as indicated in the most recent version of the handbook entitled "American Conference of Governmental Industrial Hygienists (ACGIH)," than the lowest TLV value previously modeled;

b. changes in the composition of the materials, or use of new materials, that would result in an increase in emissions of any pollutant with a listed TLV that was proposed in the application and modeled; and

c. physical changes to the emissions unit or its exhaust parameters (e.g., increased/decreased exhaust flow, changes in stack height, changes in stack diameter, etc.).

If the permittee determines that the "Air Toxic Policy" will be satisfied for the above changes, the Ohio EPA will not consider the change(s) to be a "modification" under OAC rule 3745-31-01 solely due to the emissions of any type of toxic air contaminant not previously emitted, and a modification of the existing permit to install will not be required, even if the toxic air contaminant emissions are greater than the de minimis level in OAC rule 3745-15-05. If the change(s) is (are) defined as a modification under other provisions of the modification definition, then the permittee

shall obtain a final permit to install prior to the change.

The permittee shall collect, record, and retain the following information when it conducts evaluations to determine that the changed emissions unit will satisfy the Air Toxic Policy:"

a. a description of the parameters changed(composition of materials, new pollutants emitted, change in stack/exhaust parameters, etc.);

b. documentation of it's evaluation and determination that the changed emissions unit still satisfies the "Air Toxic Policy"; and

c. when the computer modeling is performed, a copy of the resulting computer model runs that show the results of the application of the "Air Toxic Policy" for the change.

D. Reporting Requirements

1. The permittee shall submit quarterly deviation (excursion) reports to the Hamilton County Department of Environmental Services that identify all periods of time during which the following scrubber parameters were not maintained within the requirements of the Operational Restrictions:

   a. the scrubber water recirculation flow rate; and

   b. the scrubber solution pH.

   If no exceedances occurred during the reporting period then a report is required stating so. These reports shall be submitted by January 31, April 30, July 31, and October 31 of each year and shall cover the previous calendar quarters.

2. The permittee shall notify the Hamilton County Department of Environmental Services of any exceedance of the HAP emissions limitations set forth in term A.2.b. The reports shall be submitted to the Director (the Hamilton County Department of Environmental Services) by January 31, April 30, July 31 and October 31 of each year and shall cover the previous three calendar months (October through December, January through March, April through June and July through September, respectively.)

   If no exceedances occurred, the permittee shall state so in the report.

E. Testing Requirements

1. Emissions Limitations

Emissions Unit ID: **P025**

The hydrochloric acid (HCl) emissions shall not exceed 0.009 pound per hour (lb/hr)
The hydrochloric acid (HCl) emissions shall not exceed 0.040 Tons per Year (TPY)

Applicable Compliance Methods

Compliance with the hourly HCl emissions limitation shall be determined by the following calculations:

a. for the conversion of TCS to HCl in the scrubber:

actual trichlorosilane usage (lbs TCS/hr) x unit conversion trichlorosilane (1 mole TCS/135.4524 gMW TCS) x stoichiometric ratio (3 moles HCl/1 mole TCS) x unit conversion HCl (36.3609 gMW HCL/1 mole HCl) = lbs HCl/hr

b. for the addition of HCl in the hi-etch process:

actual cycle time (min/cycle) x actual production rate (cycles/hr) x actual flow rate (liters HCl/hr) x conversion factor (ft3/28.3168 liters) x conversion factor (1 lb HCl/9.7752 ft3 HCl) = lbs HCl/hr; and

c. (lbs HCl/hr from the conversion of TCS + lbs HCl/hr from the addition of HCl) x scrubber efficiency (1 - 99.5/100) = lbs HCl/hr from the scrubber stack

Compliance with the annual HCl emissions limitation shall be determined by the recordkeeping requirement in T&C C.2.h.

2. Emissions Limitation

Visible particulate emissions from any stack associated with emissions unit P025 shall not exceed 20 percent opacity, as a six-minute average, except as specified by rule

Applicable Compliance Method

Compliance shall be determined in accordance with Test Method 9 as set forth in "Appendix on Test Methods" in 40 CFR, Part 60 ("Standards of Performance for New Stationary Sources"), as such Appendix existed on July 1, 1996.

3. Emissions Limitations

9.9 TPY for any single HAP and 24.9 TPY for any combination of HAPs

Compliance with the HAPs emissions limits outlined in T&C A.2.b. shall be demonstrated by the recordkeeping requirements in T&C C.2.

4. Compliance with the operational restrictions for the wet scrubber in T&Cs B.1. and B.2. shall be demonstrated by the recordkeeping requirements in T&C C.1.

F. Miscellaneous Requirements

1. The following terms and conditions of this permit are federally enforceable: A, B, C.1, C.2, D and E.

PART II - SPECIAL TERMS AND CONDITIONS FOR SPECIFIC EMISSIONS UNIT(S)

A. Applicable Emissions Limitations and/or Control Requirements

1. The specific operations(s), property, and/or equipment which constitute this emissions unit are listed in the following table along with the applicable rules and/or requirements and with the applicable emissions limitations and/or control measures. Emissions from this unit shall not exceed the listed limitations, and the listed control measures shall be specified in narrative form following the table.

Operations, Property, and/or Equipment	Applicable Rules/Requirements	
P026 - E03 - EpiPro Pancake Reactor; CS-2 Plant-wide condenser, scrubber, and hydrogen recovery unit	OAC rule 3745-31-05(A)(3)	OAC rule 3745-17-11(B)
	OAC rule 3745-31-05(C) (to avoid being subject to OAC rules 3745-31-28 and Title V permitting requirements)	
	OAC rule 3745-17-07(A)(1)	

Applicable Emissions Limitations/Control Measures	
The hydrochloric acid (HCl) emissions shall not exceed 0.009 pound per hour (lb/hr).	
The hydrochloric acid (HCl) emissions shall not exceed 0.040 Tons per Year (TPY).	See T&C A.2.c.
The requirements of this rule also include compliance with the requirements of OAC rule 3745-31-05(C) and OAC rule 3745-17-07(A)(1).	See T&C A.2.b.
Visible particulate emissions from any stack associated with emissions unit P026 shall not exceed 20 percent opacity, as a six-minute average, except as specified by rule.	
The emission limitation specified by this rule is less stringent than the emission limitation established pursuant to OAC rule 3745-31-05(A)(3).	

2. Additional Terms and Conditions

2.a The hourly emission limitations outlined in term A.1. are based upon the emissions unit's

potential to emit. Therefore, no hourly records are required to demonstrate compliance with these limits.

2.b The actual emissions of Hazardous Air Pollutants (HAPs), as identified in Section 112(b) of Title III of the Clean Air Act, from this facility shall not exceed 9.9 TPY for any single HAP and 24.9 TPY for any combination of HAPs. Compliance with the above limitations shall be based on a rolling, 12-month summation. The permittee has existing records to demonstrate compliance with these limits upon issuance of this permit.

2.c Compliance with OAC rule 3745-31-05(A)(3) shall be demonstrated by the use of a wet scrubber, compliance with the HCl emissions limits and compliance with the facility-wide HAPs emissions limits.

B. Operational Restrictions

1. The scrubber water recirculation flow rate shall be continuously maintained at a value of not less than 60 gallons per minute at all times while the emissions unit is in operation.

2. The pH of the scrubbing liquor shall be maintained within the range of 8-13 at all times while the emissions unit is in operation.

C. Monitoring and/or Recordkeeping Requirements

1. The permittee shall properly install, operate and maintain equipment to continuously monitor the scrubber water recirculation flow rate into the scrubber and the pH of the scrubber liquor while the emissions unit is in operation. The monitoring devices and any recorders shall be installed, calibrated, operated and maintained in accordance with the manufacturer's recommendations, instructions and operating manuals.

   The permittee shall collect and record the following information each day:

   a. the scrubber water recirculation flow rate, in gallons per minute, on a once per day basis;

   b. the pH of the scrubber liquor, on a once per day basis; and

   c. the operating times for the capture (collection) system, control device, monitoring equipment, and the associated emissions unit.

2. The permittee shall collect and record the following information each month for the entire facility:

   a. for all epitaxial reactors, the amount of hydrogen chloride (HCl) used (input), in pounds;

b. for all epitaxial reactors, the amount of HCl released from the reaction of trichlorosilane, in pounds;

c. for all epitaxial reactors, the amount of controlled emissions of each HAP, in tons;

d. for all emissions units, the amount of any other material used which contains HAPs, in tons;

e. for all emissions units, the individual HAP content for each HAP of each material used, in percent by weight (ton HAP/ton material);

f. the total individual HAP emissions for each HAP from all materials employed, in tons per month [for each HAP the sum of c. plus (d. times e.)];

g. the total combined HAP emissions from all materials employed, in tons per month (the sum of all HAPs as calculated in f.);

h. the updated rolling, 12-month summation of each individual HAP emissions, in pounds or tons. This shall include the information for the current month and the preceding eleven calender months ; and

i. the updated rolling, 12-month summation of total combined HAP emissions, in pounds or tons. This shall include the information for the current month and the preceding eleven calender months.

* A listing of the HAPs can be found in Section 112(b) of the Clean Air Act or can be obtained by contacting your Hamilton County Department of Environmental Services contact. This information does not have to be kept on a individual emissions unit basis.

3. The permit to install for emissions units P024 - P035 and P051 - P074 was evaluated based on the actual materials (typically coatings and cleanup materials) and the design parameters of the emissions unit's exhaust systems, as specified by the permittee in the permit to install application. The Ohio EPA's "Review of New Sources of Air Toxic Emissions" policy ("Air Toxic Policy") was applied for each pollutant emitted by this emissions unit using data from the permit to install application and the SCREEN 3.0 model (or other Ohio EPA approved model). The predicted 1-hour maximum ground-level concentration from the use of the SCREEN 3.0 model was compared to the Maximum Ground-Level Concentration (MAGLC).

The following summarizes the results of the modeling for the "worst case" pollutant(s):

Pollutant: HCl (CAS 7647-01-0)

TLV (ug/m^3): 2198

Maximum Hourly Emission Rate (lbs/hr): 0.132 lbs/hr HCl, P024 - P035 and P051 - P074, combined

Predicted 1-Hour Maximum Ground-Level Concentration (ug/m^3): 30.68 Ug/m^3, P024 - P035 and P051 - P074, combined

MAGLC (ug/m^3): 52.33

Physical changes to or in the method of operation of the emissions unit after it's installation or modification could affect the parameters used to determine whether or not the "Air Toxics Policy" is satisfied. Consequently, prior to making a change that could impact such parameters, the permittee shall conduct an evaluation to determine that the "Air Toxic Policy" will still be satisfied. If, upon evaluation, the permittee determines that the "Air Toxic Policy" will not be satisfied, the permittee will not make the change. Changes that can affect the parameters used in the "Air Toxic Policy" include the following:

a. changes in the composition of the materials used (typically for coatings or cleanup materials), or the use of new materials, that would result in the emission of a compound with a lower Threshold Limit Value (TLV), as indicated in the most recent version of the handbook entitled "American Conference of Governmental Industrial Hygienists (ACGIH)," than the lowest TLV value previously modeled;

b. changes in the composition of the materials, or use of new materials, that would result in an increase in emissions of any pollutant with a listed TLV that was proposed in the application and modeled; and

c. physical changes to the emissions unit or its exhaust parameters (e.g., increased/decreased exhaust flow, changes in stack height, changes in stack diameter, etc.).

If the permittee determines that the "Air Toxic Policy" will be satisfied for the above changes, the Ohio EPA will not consider the change(s) to be a "modification" under OAC rule 3745-31-01 solely due to the emissions of any type of toxic air contaminant not previously emitted, and a modification of the existing permit to install will not be required, even if the toxic air contaminant emissions are greater than the de minimis level in OAC rule 3745-15-05. If the change(s) is (are) defined as a modification under other provisions of the modification definition, then the permittee shall obtain a final permit to install prior to the change.

The permittee shall collect, record, and retain the following information when it conducts evaluations to determine that the changed emissions unit will satisfy the Air Toxic Policy:"

a. a description of the parameters changed(composition of materials, new pollutants emitted, change in stack/exhaust parameters, etc.);

b. documentation of it's evaluation and determination that the changed emissions unit still satisfies the "Air Toxic Policy"; and

c. when the computer modeling is performed, a copy of the resulting computer model runs that show the results of the application of the "Air Toxic Policy" for the change.

D. Reporting Requirements

1. The permittee shall submit quarterly deviation (excursion) reports to the Hamilton County Department of Environmental Services that identify all periods of time during which the following scrubber parameters were not maintained within the requirements of the Operational Restrictions:

   a. the scrubber water recirculation flow rate; and

   b. the scrubber solution pH.

   If no exceedances occurred during the reporting period then a report is required stating so. These reports shall be submitted by January 31, April 30, July 31, and October 31 of each year and shall cover the previous calendar quarters.

2. The permittee shall notify the Hamilton County Department of Environmental Services of any exceedance of the HAP emissions limitations set forth in term A.2.b. The reports shall be submitted to the Director (the Hamilton County Department of Environmental Services) by January 31, April 30, July 31 and October 31 of each year and shall cover the previous three calendar months (October through December, January through March, April through June and July through September, respectively.)

   If no exceedances occurred, the permittee shall state so in the report.

E. Testing Requirements

1. Emissions Limitations

   The hydrochloric acid (HCl) emissions shall not exceed 0.009 pound per hour (lb/hr)
   The hydrochloric acid (HCl) emissions shall not exceed 0.040 Tons per Year (TPY)

   Applicable Compliance Methods

Compliance with the hourly HCl emissions limitation shall be determined by the following calculations:

a. for the conversion of TCS to HCl in the scrubber:

actual trichlorosilane usage (lbs TCS/hr) x unit conversion trichlorosilane (1 mole TCS/135.4524 gMW TCS) x stoichiometric ratio (3 moles HCl/1 mole TCS) x unit conversion HCl (36.3609 gMW HCL/1 mole HCl) = lbs HCl/hr

b. for the addition of HCl in the hi-etch process:

actual cycle time (min/cycle) x actual production rate (cycles/hr) x actual flow rate (liters HCl/hr) x conversion factor (ft3/28.3168 liters) x conversion factor (1 lb HCl/9.7752 ft3 HCl) = lbs HCl/hr; and

c. (lbs HCl/hr from the conversion of TCS + lbs HCl/hr from the addition of HCl) x scrubber efficiency (1 - 99.5/100) = lbs HCl/hr from the scrubber stack

Compliance with the annual HCl emissions limitation shall be determined by the recordkeeping requirement in T&C C.2.h.

2. Emissions Limitation

Visible particulate emissions from any stack associated with emissions unit P026 shall not exceed 20 percent opacity, as a six-minute average, except as specified by rule

Applicable Compliance Method

Compliance shall be determined in accordance with Test Method 9 as set forth in "Appendix on Test Methods" in 40 CFR, Part 60 ("Standards of Performance for New Stationary Sources"), as such Appendix existed on July 1, 1996.

3. Emissions Limitations

9.9 TPY for any single HAP and 24.9 TPY for any combination of HAPs

Compliance with the HAPs emissions limits outlined in T&C A.2.b. shall be demonstrated by the recordkeeping requirements in T&C C.2.

4. Compliance with the operational restrictions for the wet scrubber in T&Cs B.1. and B.2. shall be demonstrated by the recordkeeping requirements in T&C C.1.

F. Miscellaneous Requirements

1. The following terms and conditions of this permit are federally enforceable: A, B, C.1, C.2, D and E.

PART II - SPECIAL TERMS AND CONDITIONS FOR SPECIFIC EMISSIONS UNIT(S)

A. Applicable Emissions Limitations and/or Control Requirements

1. The specific operations(s), property, and/or equipment which constitute this emissions unit are listed in the following table along with the applicable rules and/or requirements and with the applicable emissions limitations and/or control measures. Emissions from this unit shall not exceed the listed limitations, and the listed control measures shall be specified in narrative form following the table.

Operations, Property, and/or Equipment	Applicable Rules/Requirements	
P027 - E04 - EpiPro Pancake Reactor; CS-2 - Plant-wide condenser, scrubber, and hyrdrogen recovery unit	OAC rule 3745-31-05(A)(3)	OAC rule 3745-17-11(B)
	OAC rule 3745-31-05(C) (to avoid being subject to OAC rules 3745-31-28 and Title V permitting requirements)	
	OAC rule 3745-17-07(A)(1)	

Applicable Emissions Limitations/Control Measures
The hydrochloric acid (HCl) emissions shall not exceed 0.009 pound per hour (lb/hr).
The hydrochloric acid (HCl) emissions shall not exceed 0.040 Tons per Year (TPY). See T&C A.2.c.
The requirements of this rule also include compliance with the requirements of OAC rule 3745-31-05(C) and OAC rule 3745-17-07(A)(1). See T&C A.2.b.
Visible particulate emissions from any stack associated with emissions unit P027 shall not exceed 20 percent opacity, as a six-minute average, except as specified by rule.
The emission limitation specified by this rule is less stringent than the emission limitation established pursuant to OAC rule 3745-31-05(A)(3).

2. Additional Terms and Conditions

2.a The hourly emission limitations outlined in term A.1. are based upon the emissions unit's

potential to emit. Therefore, no hourly records are required to demonstrate compliance with these limits.

2.b The actual emissions of Hazardous Air Pollutants (HAPs), as identified in Section 112(b) of Title III of the Clean Air Act, from this facility shall not exceed 9.9 TPY for any single HAP and 24.9 TPY for any combination of HAPs. Compliance with the above limitations shall be based on a rolling, 12-month summation. The permittee has existing records to demonstrate compliance with these limits upon issuance of this permit.

2.c Compliance with OAC rule 3745-31-05(A)(3) shall be demonstrated by the use of a wet scrubber, compliance with the HCl emissions limits and compliance with the facility-wide HAPs emissions limits.

B. Operational Restrictions

1. The scrubber water recirculation flow rate shall be continuously maintained at a value of not less than 60 gallons per minute at all times while the emissions unit is in operation.

2. The pH of the scrubbing liquor shall be maintained within the range of 8-13 at all times while the emissions unit is in operation.

C. Monitoring and/or Recordkeeping Requirements

1. The permittee shall properly install, operate and maintain equipment to continuously monitor the scrubber water recirculation flow rate into the scrubber and the pH of the scrubber liquor while the emissions unit is in operation. The monitoring devices and any recorders shall be installed, calibrated, operated and maintained in accordance with the manufacturer's recommendations, instructions and operating manuals.

   The permittee shall collect and record the following information each day:

   a. the scrubber water recirculation flow rate, in gallons per minute, on a once per day basis;

   b. the pH of the scrubber liquor, on a once per day basis; and

   c. the operating times for the capture (collection) system, control device, monitoring equipment, and the associated emissions unit.

2. The permittee shall collect and record the following information each month for the entire facility:

   a. for all epitaxial reactors, the amount of hydrogen chloride (HCl) used (input), in pounds;

b. for all epitaxial reactors, the amount of HCl released from the reaction of trichlorosilane, in pounds;

c. for all epitaxial reactors, the amount of controlled emissions of each HAP, in tons;

d. for all emissions units, the amount of any other material used which contains HAPs, in tons;

e. for all emissions units, the individual HAP content for each HAP of each material used, in percent by weight (ton HAP/ton material);

f. the total individual HAP emissions for each HAP from all materials employed, in tons per month [for each HAP the sum of c. plus (d. times e.)];

g. the total combined HAP emissions from all materials employed, in tons per month (the sum of all HAPs as calculated in f.);

h. the updated rolling, 12-month summation of each individual HAP emissions, in pounds or tons. This shall include the information for the current month and the preceding eleven calender months ; and

i. the updated rolling, 12-month summation of total combined HAP emissions, in pounds or tons. This shall include the information for the current month and the preceding eleven calender months.

* A listing of the HAPs can be found in Section 112(b) of the Clean Air Act or can be obtained by contacting your Hamilton County Department of Environmental Services contact. This information does not have to be kept on a individual emissions unit basis

3. The permit to install for emissions units P024 - P035 and P051 - P074 was evaluated based on the actual materials (typically coatings and cleanup materials) and the design parameters of the emissions unit's exhaust systems, as specified by the permittee in the permit to install application. The Ohio EPA's "Review of New Sources of Air Toxic Emissions" policy ("Air Toxic Policy") was applied for each pollutant emitted by this emissions unit using data from the permit to install application and the SCREEN 3.0 model (or other Ohio EPA approved model). The predicted 1-hour maximum ground-level concentration from the use of the SCREEN 3.0 model was compared to the Maximum Ground-Level Concentration (MAGLC).

The following summarizes the results of the modeling for the "worst case" pollutant(s):

Pollutant: HCl (CAS 7647-01-0)

TLV (ug/m^3): 2198

Maximum Hourly Emission Rate (lbs/hr): 0.132 lbs/hr HCl, P024 - P035 and P051 - P074, combined

Predicted 1-Hour Maximum Ground-Level Concentration (ug/m^3): 30.68 Ug/m^3, P024 - P035 and P051 - P074, combined

MAGLC (ug/m^3): 52.33

Physical changes to or in the method of operation of the emissions unit after it's installation or modification could affect the parameters used to determine whether or not the "Air Toxics Policy" is satisfied. Consequently, prior to making a change that could impact such parameters, the permittee shall conduct an evaluation to determine that the "Air Toxic Policy" will still be satisfied. If, upon evaluation, the permittee determines that the "Air Toxic Policy" will not be satisfied, the permittee will not make the change. Changes that can affect the parameters used in the "Air Toxic Policy" include the following:

a. changes in the composition of the materials used (typically for coatings or cleanup materials), or the use of new materials, that would result in the emission of a compound with a lower Threshold Limit Value (TLV), as indicated in the most recent version of the handbook entitled "American Conference of Governmental Industrial Hygienists (ACGIH)," than the lowest TLV value previously modeled;

b. changes in the composition of the materials, or use of new materials, that would result in an increase in emissions of any pollutant with a listed TLV that was proposed in the application and modeled; and

c. physical changes to the emissions unit or its exhaust parameters (e.g., increased/decreased exhaust flow, changes in stack height, changes in stack diameter, etc.).

If the permittee determines that the "Air Toxic Policy" will be satisfied for the above changes, the Ohio EPA will not consider the change(s) to be a "modification" under OAC rule 3745-31-01 solely due to the emissions of any type of toxic air contaminant not previously emitted, and a modification of the existing permit to install will not be required, even if the toxic air contaminant emissions are greater than the de minimis level in OAC rule 3745-15-05. If the change(s) is (are) defined as a modification under other provisions of the modification definition, then the permittee shall obtain a final permit to install prior to the change.

The permittee shall collect, record, and retain the following information when it conducts evaluations to determine that the changed emissions unit will satisfy the Air Toxic Policy:"

a. a description of the parameters changed(composition of materials, new pollutants emitted, change in stack/exhaust parameters, etc.);

b. documentation of it's evaluation and determination that the changed emissions unit still satisfies the "Air Toxic Policy"; and

c. when the computer modeling is performed, a copy of the resulting computer model runs that show the results of the application of the "Air Toxic Policy" for the change.

D. Reporting Requirements

1. The permittee shall submit quarterly deviation (excursion) reports to the Hamilton County Department of Environmental Services that identify all periods of time during which the following scrubber parameters were not maintained within the requirements of the Operational Restrictions:

   a. the scrubber water recirculation flow rate; and

   b. the scrubber solution pH.

   If no exceedances occurred during the reporting period then a report is required stating so. These reports shall be submitted by January 31, April 30, July 31, and October 31 of each year and shall cover the previous calendar quarters.

2. The permittee shall notify the Hamilton County Department of Environmental Services of any exceedance of the HAP emissions limitations set forth in term A.2.b. The reports shall be submitted to the Director (the Hamilton County Department of Environmental Services) by January 31, April 30, July 31 and October 31 of each year and shall cover the previous three calendar months (October through December, January through March, April through June and July through September, respectively.)

   If no exceedances occurred, the permittee shall state so in the report.

E. Testing Requirements

1. Emissions Limitations

   The hydrochloric acid (HCl) emissions shall not exceed 0.009 pound per hour (lb/hr)
   The hydrochloric acid (HCl) emissions shall not exceed 0.040 Tons per Year (TPY)

   Applicable Compliance Methods

Compliance with the hourly HCl emissions limitation shall be determined by the following calculations:

a. for the conversion of TCS to HCl in the scrubber:

actual trichlorosilane usage (lbs TCS/hr) x unit conversion trichlorosilane (1 mole TCS/135.4524 gMW TCS) x stoichiometric ratio (3 moles HCl/1 mole TCS) x unit conversion HCl (36.3609 gMW HCL/1 mole HCl) = lbs HCl/hr

b. for the addition of HCl in the hi-etch process:

actual cycle time (min/cycle) x actual production rate (cycles/hr) x actual flow rate (liters HCl/hr) x conversion factor (ft3/28.3168 liters) x conversion factor (1 lb HCl/9.7752 ft3 HCl) = lbs HCl/hr; and

c. (lbs HCl/hr from the conversion of TCS + lbs HCl/hr from the addition of HCl) x scrubber efficiency (1 - 99.5/100) = lbs HCl/hr from the scrubber stack

Compliance with the annual HCl emissions limitation shall be determined by the recordkeeping requirement in T&C C.2.h.

2. Emissions Limitation

Visible particulate emissions from any stack associated with emissions unit P027 shall not exceed 20 percent opacity, as a six-minute average, except as specified by rule

Applicable Compliance Method

Compliance shall be determined in accordance with Test Method 9 as set forth in "Appendix on Test Methods" in 40 CFR, Part 60 ("Standards of Performance for New Stationary Sources"), as such Appendix existed on July 1, 1996.

3. Emissions Limitations

9.9 TPY for any single HAP and 24.9 TPY for any combination of HAPs

Compliance with the HAPs emissions limits outlined in T&C A.2.b. shall be demonstrated by the recordkeeping requirements in T&C C.2.

4. Compliance with the operational restrictions for the wet scrubber in T&Cs B.1. and B.2. shall be demonstrated by the recordkeeping requirements in T&C C.1.

F. Miscellaneous Requirements

1. The following terms and conditions of this permit are federally enforceable: A, B, C.1, C.2, D and E.

PART II - SPECIAL TERMS AND CONDITIONS FOR SPECIFIC EMISSIONS UNIT(S)

A. Applicable Emissions Limitations and/or Control Requirements

1. The specific operations(s), property, and/or equipment which constitute this emissions unit are listed in the following table along with the applicable rules and/or requirements and with the applicable emissions limitations and/or control measures. Emissions from this unit shall not exceed the listed limitations, and the listed control measures shall be specified in narrative form following the table.

Operations, Property, and/or Equipment	Applicable Rules/Requirements	
P028 - E05 - EpiPro Pancake Reactor; CS-2 - Plant-wide condenser, scrubber, and hydrogen recovery unit	OAC rule 3745-31-05(A)(3)	OAC rule 3745-17-11(B)
	OAC rule 3745-31-05(C) (to avoid being subject to OAC rules 3745-31-28 and Title V permitting requirements)	
	OAC rule 3745-17-07(A)(1)	

Applicable Emissions Limitations/Control Measures
The hydrochloric acid (HCl) emissions shall not exceed 0.009 pound per hour (lb/hr).
The hydrochloric acid (HCl) emissions shall not exceed 0.040 Tons per Year (TPY). See T&C A.2.c.
The requirements of this rule also include compliance with the requirements of OAC rule 3745-31-05(C) and OAC rule 3745-17-07(A)(1). See T&C A.2.b.
Visible particulate emissions from any stack associated with emissions unit P028 shall not exceed 20 percent opacity, as a six-minute average, except as specified by rule.
The emission limitation specified by this rule is less stringent than the emission limitation established pursuant to OAC rule 3745-31-05(A)(3).

2. Additional Terms and Conditions

2.a The hourly emission limitations outlined in term A.1. are based upon the emissions unit's

potential to emit. Therefore, no hourly records are required to demonstrate compliance with these limits.

2.b The actual emissions of Hazardous Air Pollutants (HAPs), as identified in Section 112(b) of Title III of the Clean Air Act, from this facility shall not exceed 9.9 TPY for any single HAP and 24.9 TPY for any combination of HAPs. Compliance with the above limitations shall be based on a rolling, 12-month summation. The permittee has existing records to demonstrate compliance with these limits upon issuance of this permit.

2.c Compliance with OAC rule 3745-31-05(A)(3) shall be demonstrated by the use of a wet scrubber, compliance with the HCl emissions limits and compliance with the facility-wide HAPs emissions limits.

B. Operational Restrictions

1. The scrubber water recirculation flow rate shall be continuously maintained at a value of not less than 60 gallons per minute at all times while the emissions unit is in operation.

2. The pH of the scrubbing liquor shall be maintained within the range of 8-13 at all times while the emissions unit is in operation.

C. Monitoring and/or Recordkeeping Requirements

1. The permittee shall properly install, operate and maintain equipment to continuously monitor the scrubber water recirculation flow rate into the scrubber and the pH of the scrubber liquor while the emissions unit is in operation. The monitoring devices and any recorders shall be installed, calibrated, operated and maintained in accordance with the manufacturer's recommendations, instructions and operating manuals.

   The permittee shall collect and record the following information each day:

   a. the scrubber water recirculation flow rate, in gallons per minute, on a once per day basis;

   b. the pH of the scrubber liquor, on a once per day basis; and

   c. the operating times for the capture (collection) system, control device, monitoring equipment, and the associated emissions unit.

2. The permittee shall collect and record the following information each month for the entire facility:

   a. for all epitaxial reactors, the amount of hydrogen chloride (HCl) used (input), in pounds;

b. for all epitaxial reactors, the amount of HCl released from the reaction of trichlorosilane, in pounds;

c. for all epitaxial reactors, the amount of controlled emissions of each HAP, in tons;

d. for all emissions units, the amount of any other material used which contains HAPs, in tons;

e. for all emissions units, the individual HAP content for each HAP of each material used, in percent by weight (ton HAP/ton material);

f. the total individual HAP emissions for each HAP from all materials employed, in tons per month [for each HAP the sum of c. plus (d. times e.)];

g. the total combined HAP emissions from all materials employed, in tons per month (the sum of all HAPs as calculated in f.);

h. the updated rolling, 12-month summation of each individual HAP emissions, in pounds or tons. This shall include the information for the current month and the preceding eleven calender months ; and

i. the updated rolling, 12-month summation of total combined HAP emissions, in pounds or tons. This shall include the information for the current month and the preceding eleven calender months.

* A listing of the HAPs can be found in Section 112(b) of the Clean Air Act or can be obtained by contacting your Hamilton County Department of Environmental Services contact. This information does not have to be kept on a individual emissions unit basis.

3. The permit to install for emissions units P024 - P035 and P051 - P074 was evaluated based on the actual materials (typically coatings and cleanup materials) and the design parameters of the emissions unit's exhaust systems, as specified by the permittee in the permit to install application. The Ohio EPA's "Review of New Sources of Air Toxic Emissions" policy ("Air Toxic Policy") was applied for each pollutant emitted by this emissions unit using data from the permit to install application and the SCREEN 3.0 model (or other Ohio EPA approved model). The predicted 1-hour maximum ground-level concentration from the use of the SCREEN 3.0 model was compared to the Maximum Ground-Level Concentration (MAGLC).

The following summarizes the results of the modeling for the "worst case" pollutant(s):

Pollutant: HCl (CAS 7647-01-0)

TLV (ug/m^3): 2198

Maximum Hourly Emission Rate (lbs/hr): 0.132 lbs/hr HCl, P024 - P035 and P051 - P074, combined

Predicted 1-Hour Maximum Ground-Level Concentration (ug/m^3): 30.68 Ug/m^3, P024 - P035 and P051 - P074, combined

MAGLC (ug/m^3): 52.33

Physical changes to or in the method of operation of the emissions unit after it's installation or modification could affect the parameters used to determine whether or not the "Air Toxics Policy" is satisfied. Consequently, prior to making a change that could impact such parameters, the permittee shall conduct an evaluation to determine that the "Air Toxic Policy" will still be satisfied. If, upon evaluation, the permittee determines that the "Air Toxic Policy" will not be satisfied, the permittee will not make the change. Changes that can affect the parameters used in the "Air Toxic Policy" include the following:

a. changes in the composition of the materials used (typically for coatings or cleanup materials), or the use of new materials, that would result in the emission of a compound with a lower Threshold Limit Value (TLV), as indicated in the most recent version of the handbook entitled "American Conference of Governmental Industrial Hygienists (ACGIH)," than the lowest TLV value previously modeled;

b. changes in the composition of the materials, or use of new materials, that would result in an increase in emissions of any pollutant with a listed TLV that was proposed in the application and modeled; and

c. physical changes to the emissions unit or its exhaust parameters (e.g., increased/decreased exhaust flow, changes in stack height, changes in stack diameter, etc.).

If the permittee determines that the "Air Toxic Policy" will be satisfied for the above changes, the Ohio EPA will not consider the change(s) to be a "modification" under OAC rule 3745-31-01 solely due to the emissions of any type of toxic air contaminant not previously emitted, and a modification of the existing permit to install will not be required, even if the toxic air contaminant emissions are greater than the de minimis level in OAC rule 3745-15-05. If the change(s) is (are) defined as a modification under other provisions of the modification definition, then the permittee

shall obtain a final permit to install prior to the change.

The permittee shall collect, record, and retain the following information when it conducts evaluations to determine that the changed emissions unit will satisfy the Air Toxic Policy:"

a. a description of the parameters changed(composition of materials, new pollutants emitted, change in stack/exhaust parameters, etc.);

b. documentation of it's evaluation and determination that the changed emissions unit still satisfies the "Air Toxic Policy"; and

c. when the computer modeling is performed, a copy of the resulting computer model runs that show the results of the application of the "Air Toxic Policy" for the change.

D. Reporting Requirements

1. The permittee shall submit quarterly deviation (excursion) reports to the Hamilton County Department of Environmental Services that identify all periods of time during which the following scrubber parameters were not maintained within the requirements of the Operational Restrictions:

   a. the scrubber water recirculation flow rate; and

   b. the scrubber solution pH.

   If no exceedances occurred during the reporting period then a report is required stating so. These reports shall be submitted by January 31, April 30, July 31, and October 31 of each year and shall cover the previous calendar quarters.

2. The permittee shall notify the Hamilton County Department of Environmental Services of any exceedance of the HAP emissions limitations set forth in term A.2.b. The reports shall be submitted to the Director (the Hamilton County Department of Environmental Services) by January 31, April 30, July 31 and October 31 of each year and shall cover the previous three calendar months (October through December, January through March, April through June and July through September, respectively.)

   If no exceedances occurred, the permittee shall state so in the report.

E. Testing Requirements

1. Emissions Limitations

Emissions Unit ID: **P028**

The hydrochloric acid (HCl) emissions shall not exceed 0.009 pound per hour (lb/hr)
The hydrochloric acid (HCl) emissions shall not exceed 0.040 Tons per Year (TPY)

Applicable Compliance Methods

Compliance with the hourly HCl emissions limitation shall be determined by the following calculations:

a. for the conversion of TCS to HCl in the scrubber:

actual trichlorosilane usage (lbs TCS/hr) x unit conversion trichlorosilane (1 mole TCS/135.4524 gMW TCS) x stoichiometric ratio (3 moles HCl/1 mole TCS) x unit conversion HCl (36.3609 gMW HCL/1 mole HCl) = lbs HCl/hr

b. for the addition of HCl in the hi-etch process:

actual cycle time (min/cycle) x actual production rate (cycles/hr) x actual flow rate (liters HCl/hr) x conversion factor (ft3/28.3168 liters) x conversion factor (1 lb HCl/9.7752 ft3 HCl) = lbs HCl/hr; and

c. (lbs HCl/hr from the conversion of TCS + lbs HCl/hr from the addition of HCl) x scrubber efficiency (1 - 99.5/100) = lbs HCl/hr from the scrubber stack

Compliance with the annual HCl emissions limitation shall be determined by the recordkeeping requirement in T&C C.2.h.

2. Emissions Limitation

Visible particulate emissions from any stack associated with emissions unit P028 shall not exceed 20 percent opacity, as a six-minute average, except as specified by rule

Applicable Compliance Method

Compliance shall be determined in accordance with Test Method 9 as set forth in "Appendix on Test Methods" in 40 CFR, Part 60 ("Standards of Performance for New Stationary Sources"), as such Appendix existed on July 1, 1996.

3. Emissions Limitations

9.9 TPY for any single HAP and 24.9 TPY for any combination of HAPs

Compliance with the HAPs emissions limits outlined in T&C A.2.b. shall be demonstrated by the recordkeeping requirements in T&C C.2.

4. Compliance with the operational restrictions for the wet scrubber in T&Cs B.1. and B.2. shall be demonstrated by the recordkeeping requirements in T&C C.1.

F. Miscellaneous Requirements

1. The following terms and conditions of this permit are federally enforceable: A, B, C.1, C.2, D and E.

PART II - SPECIAL TERMS AND CONDITIONS FOR SPECIFIC EMISSIONS UNIT(S)

A. Applicable Emissions Limitations and/or Control Requirements

1. The specific operations(s), property, and/or equipment which constitute this emissions unit are listed in the following table along with the applicable rules and/or requirements and with the applicable emissions limitations and/or control measures. Emissions from this unit shall not exceed the listed limitations, and the listed control measures shall be specified in narrative form following the table.

Operations, Property, and/or Equipment	Applicable Rules/Requirements	OAC rule 3745-17-11(B)
P029 - E06 - EpiPro Pancake Reactor; CS-2 - Plant-wide condenser, scrubber, and hydrogen recovery unit	OAC rule 3745-31-05(A)(3)	
	OAC rule 3745-31-05(C) (to avoid being subject to OAC rules 3745-31-28 and Title V permitting requirements)	
	OAC rule 3745-17-07(A)(1)	

Applicable Emissions Limitations/Control Measures	
The hydrochloric acid (HCl) emissions shall not exceed 0.009 pound per hour (lb/hr).	
The hydrochloric acid (HCl) emissions shall not exceed 0.040 Tons per Year (TPY).	See T&C A.2.c.
The requirements of this rule also include compliance with the requirements of OAC rule 3745-31-05(C) and OAC rule 3745-17-07(A)(1).	See T&C A.2.b.
Visible particulate emissions from any stack associated with emissions unit P029 shall not exceed 20 percent opacity, as a six-minute average, except as specified by rule.	
The emission limitation specified by this rule is less stringent than the emission limitation established pursuant to OAC rule 3745-31-05(A)(3).	

2. Additional Terms and Conditions

2.a The hourly emission limitations outlined in term A.1. are based upon the emissions unit's

potential to emit. Therefore, no hourly records are required to demonstrate compliance with these limits.

2.b The actual emissions of Hazardous Air Pollutants (HAPs), as identified in Section 112(b) of Title III of the Clean Air Act, from this facility shall not exceed 9.9 TPY for any single HAP and 24.9 TPY for any combination of HAPs. Compliance with the above limitations shall be based on a rolling, 12-month summation. The permittee has existing records to demonstrate compliance with these limits upon issuance of this permit.

2.c Compliance with OAC rule 3745-31-05(A)(3) shall be demonstrated by the use of a wet scrubber, compliance with the HCl emissions limits and compliance with the facility-wide HAPs emissions limits.

B. Operational Restrictions

1. The scrubber water recirculation flow rate shall be continuously maintained at a value of not less than 60 gallons per minute at all times while the emissions unit is in operation.

2. The pH of the scrubbing liquor shall be maintained within the range of 8-13 at all times while the emissions unit is in operation.

C. Monitoring and/or Recordkeeping Requirements

1. The permittee shall properly install, operate and maintain equipment to continuously monitor the scrubber water recirculation flow rate into the scrubber and the pH of the scrubber liquor while the emissions unit is in operation. The monitoring devices and any recorders shall be installed, calibrated, operated and maintained in accordance with the manufacturer's recommendations, instructions and operating manuals.

   The permittee shall collect and record the following information each day:

   a. the scrubber water recirculation flow rate, in gallons per minute, on a once per day basis;

   b. the pH of the scrubber liquor, on a once per day basis; and

   c. the operating times for the capture (collection) system, control device, monitoring equipment, and the associated emissions unit.

2. The permittee shall collect and record the following information each month for the entire facility:

   a. for all epitaxial reactors, the amount of hydrogen chloride (HCl) used (input), in pounds;

b. for all epitaxial reactors, the amount of HCl released from the reaction of trichlorosilane, in pounds;

c. for all epitaxial reactors, the amount of controlled emissions of each HAP, in tons;

d. for all emissions units, the amount of any other material used which contains HAPs, in tons;

e. for all emissions units, the individual HAP content for each HAP of each material used, in percent by weight (ton HAP/ton material);

f. the total individual HAP emissions for each HAP from all materials employed, in tons per month [for each HAP the sum of c. plus (d. times e.)];

g. the total combined HAP emissions from all materials employed, in tons per month (the sum of all HAPs as calculated in f.);

h. the updated rolling, 12-month summation of each individual HAP emissions, in pounds or tons. This shall include the information for the current month and the preceding eleven calender months ; and

i. the updated rolling, 12-month summation of total combined HAP emissions, in pounds or tons. This shall include the information for the current month and the preceding eleven calender months.

* A listing of the HAPs can be found in Section 112(b) of the Clean Air Act or can be obtained by contacting your Hamilton County Department of Environmental Services contact. This information does not have to be kept on a individual emissions unit basis.

3. The permit to install for emissions units P024 - P035 and P051 - P074 was evaluated based on the actual materials (typically coatings and cleanup materials) and the design parameters of the emissions unit's exhaust systems, as specified by the permittee in the permit to install application. The Ohio EPA's "Review of New Sources of Air Toxic Emissions" policy ("Air Toxic Policy") was applied for each pollutant emitted by this emissions unit using data from the permit to install application and the SCREEN 3.0 model (or other Ohio EPA approved model). The predicted 1-hour maximum ground-level concentration from the use of the SCREEN 3.0 model was compared to the Maximum Ground-Level Concentration (MAGLC).

The following summarizes the results of the modeling for the "worst case" pollutant(s):

Pollutant: HCl (CAS 7647-01-0)

TLV (ug/m^3): 2198

Maximum Hourly Emission Rate (lbs/hr): 0.132 lbs/hr HCl, P024 - P035 and P051 - P074, combined

Predicted 1-Hour Maximum Ground-Level Concentration (ug/m^3): 30.68 Ug/m^3, P024 - P035 and P051 - P074, combined

MAGLC (ug/m^3): 52.33

Physical changes to or in the method of operation of the emissions unit after it's installation or modification could affect the parameters used to determine whether or not the "Air Toxics Policy" is satisfied. Consequently, prior to making a change that could impact such parameters, the permittee shall conduct an evaluation to determine that the "Air Toxic Policy" will still be satisfied. If, upon evaluation, the permittee determines that the "Air Toxic Policy" will not be satisfied, the permittee will not make the change. Changes that can affect the parameters used in the "Air Toxic Policy" include the following:

a. changes in the composition of the materials used (typically for coatings or cleanup materials), or the use of new materials, that would result in the emission of a compound with a lower Threshold Limit Value (TLV), as indicated in the most recent version of the handbook entitled "American Conference of Governmental Industrial Hygienists (ACGIH)," than the lowest TLV value previously modeled;

b. changes in the composition of the materials, or use of new materials, that would result in an increase in emissions of any pollutant with a listed TLV that was proposed in the application and modeled; and

c. physical changes to the emissions unit or its exhaust parameters (e.g., increased/decreased exhaust flow, changes in stack height, changes in stack diameter, etc.).

If the permittee determines that the "Air Toxic Policy" will be satisfied for the above changes, the Ohio EPA will not consider the change(s) to be a "modification" under OAC rule 3745-31-01 solely due to the emissions of any type of toxic air contaminant not previously emitted, and a modification of the existing permit to install will not be required, even if the toxic air contaminant emissions are greater than the de minimis level in OAC rule 3745-15-05. If the change(s) is (are) defined as a modification under other provisions of the modification definition, then the permittee shall obtain a final permit to install prior to the change.

The permittee shall collect, record, and retain the following information when it conducts evaluations to determine that the changed emissions unit will satisfy the Air Toxic Policy:"

a. a description of the parameters changed(composition of materials, new pollutants emitted, change in stack/exhaust parameters, etc.);

b. documentation of it's evaluation and determination that the changed emissions unit still satisfies the "Air Toxic Policy"; and

c. when the computer modeling is performed, a copy of the resulting computer model runs that show the results of the application of the "Air Toxic Policy" for the change.

D. Reporting Requirements

1. The permittee shall submit quarterly deviation (excursion) reports to the Hamilton County Department of Environmental Services that identify all periods of time during which the following scrubber parameters were not maintained within the requirements of the Operational Restrictions:

   a. the scrubber water recirculation flow rate; and

   b. the scrubber solution pH.

   If no exceedances occurred during the reporting period then a report is required stating so. These reports shall be submitted by January 31, April 30, July 31, and October 31 of each year and shall cover the previous calendar quarters.

2. The permittee shall notify the Hamilton County Department of Environmental Services of any exceedance of the HAP emissions limitations set forth in term A.2.b. The reports shall be submitted to the Director (the Hamilton County Department of Environmental Services) by January 31, April 30, July 31 and October 31 of each year and shall cover the previous three calendar months (October through December, January through March, April through June and July through September, respectively.)

   If no exceedances occurred, the permittee shall state so in the report.

E. Testing Requirements

1. Emissions Limitations

   The hydrochloric acid (HCl) emissions shall not exceed 0.009 pound per hour (lb/hr)
   The hydrochloric acid (HCl) emissions shall not exceed 0.040 Tons per Year (TPY)

   Applicable Compliance Methods

Compliance with the hourly HCl emissions limitation shall be determined by the following calculations:

a. for the conversion of TCS to HCl in the scrubber:

actual trichlorosilane usage (lbs TCS/hr) x unit conversion trichlorosilane (1 mole TCS/135.4524 gMW TCS) x stoichiometric ratio (3 moles HCl/1 mole TCS) x unit conversion HCl (36.3609 gMW HCL/1 mole HCl) = lbs HCl/hr

b. for the addition of HCl in the hi-etch process:

actual cycle time (min/cycle) x actual production rate (cycles/hr) x actual flow rate (liters HCl/hr) x conversion factor (ft3/28.3168 liters) x conversion factor (1 lb HCl/9.7752 ft3 HCl) = lbs HCl/hr; and

c. (lbs HCl/hr from the conversion of TCS + lbs HCl/hr from the addition of HCl) x scrubber efficiency (1 - 99.5/100) = lbs HCl/hr from the scrubber stack

Compliance with the annual HCl emissions limitation shall be determined by the recordkeeping requirement in T&C C.2.h.

2. Emissions Limitation

Visible particulate emissions from any stack associated with emissions unit P029 shall not exceed 20 percent opacity, as a six-minute average, except as specified by rule

Applicable Compliance Method

Compliance shall be determined in accordance with Test Method 9 as set forth in "Appendix on Test Methods" in 40 CFR, Part 60 ("Standards of Performance for New Stationary Sources"), as such Appendix existed on July 1, 1996.

3. Emissions Limitations

9.9 TPY for any single HAP and 24.9 TPY for any combination of HAPs

Compliance with the HAPs emissions limits outlined in T&C A.2.b. shall be demonstrated by the recordkeeping requirements in T&C C.2.

4. Compliance with the operational restrictions for the wet scrubber in T&Cs B.1. and B.2. shall be demonstrated by the recordkeeping requirements in T&C C.1.

F. Miscellaneous Requirements

1. The following terms and conditions of this permit are federally enforceable: A, B, C.1, C.2, D and E.

PART II - SPECIAL TERMS AND CONDITIONS FOR SPECIFIC EMISSIONS UNIT(S)

A. Applicable Emissions Limitations and/or Control Requirements

1. The specific operations(s), property, and/or equipment which constitute this emissions unit are listed in the following table along with the applicable rules and/or requirements and with the applicable emissions limitations and/or control measures. Emissions from this unit shall not exceed the listed limitations, and the listed control measures shall be specified in narrative form following the table.

Operations, Property, and/or Equipment	Applicable Rules/Requirements	OAC rule 3745-17-11(B)
P030 - E07-EpiPro Pancake Reactor; CS-2 - Plant-wide condenser, scrubber, and hydrogen recovery unit	OAC rule 3745-31-05(A)(3)	
	OAC rule 3745-31-05(C) (to avoid being subject to OAC rules 3745-31-28 and Title V permitting requirements)	
	OAC rule 3745-17-07(A)(1)	

Applicable Emissions Limitations/Control Measures
The hydrochloric acid (HCl) emissions shall not exceed 0.009 pound per hour (lb/hr).
The hydrochloric acid (HCl) emissions shall not exceed 0.040 Tons per Year (TPY). See T&C A.2.c.
The requirements of this rule also include compliance with the requirements of OAC rule 3745-31-05(C) and OAC rule 3745-17-07(A)(1). See T&C A.2.b.
Visible particulate emissions from any stack associated with emissions unit P030 shall not exceed 20 percent opacity, as a six-minute average, except as specified by rule.
The emission limitation specified by this rule is less stringent than the emission limitation established pursuant to OAC rule 3745-31-05(A)(3).

2. Additional Terms and Conditions

2.a The hourly emission limitations outlined in term A.1. are based upon the emissions unit's

potential to emit. Therefore, no hourly records are required to demonstrate compliance with these limits.

2.b The actual emissions of Hazardous Air Pollutants (HAPs), as identified in Section 112(b) of Title III of the Clean Air Act, from this facility shall not exceed 9.9 TPY for any single HAP and 24.9 TPY for any combination of HAPs. Compliance with the above limitations shall be based on a rolling, 12-month summation. The permittee has existing records to demonstrate compliance with these limits upon issuance of this permit.

2.c Compliance with OAC rule 3745-31-05(A)(3) shall be demonstrated by the use of a wet scrubber, compliance with the HCl emissions limits and compliance with the facility-wide HAPs emissions limits.

B. Operational Restrictions

1. The scrubber water recirculation flow rate shall be continuously maintained at a value of not less than 60 gallons per minute at all times while the emissions unit is in operation.

2. The pH of the scrubbing liquor shall be maintained within the range of 8-13 at all times while the emissions unit is in operation.

C. Monitoring and/or Recordkeeping Requirements

1. The permittee shall properly install, operate and maintain equipment to continuously monitor the scrubber water recirculation flow rate into the scrubber and the pH of the scrubber liquor while the emissions unit is in operation. The monitoring devices and any recorders shall be installed, calibrated, operated and maintained in accordance with the manufacturer's recommendations, instructions and operating manuals.

   The permittee shall collect and record the following information each day:

   a. the scrubber water recirculation flow rate, in gallons per minute, on a once per day basis;

   b. the pH of the scrubber liquor, on a once per day basis; and

   c. the operating times for the capture (collection) system, control device, monitoring equipment, and the associated emissions unit.

2. The permittee shall collect and record the following information each month for the entire facility:

   a. for all epitaxial reactors, the amount of hydrogen chloride (HCl) used (input), in pounds;

b. for all epitaxial reactors, the amount of HCl released from the reaction of trichlorosilane, in pounds;

c. for all epitaxial reactors, the amount of controlled emissions of each HAP, in tons;

d. for all emissions units, the amount of any other material used which contains HAPs, in tons;

e. for all emissions units, the individual HAP content for each HAP of each material used, in percent by weight (ton HAP/ton material);

f. the total individual HAP emissions for each HAP from all materials employed, in tons per month [for each HAP the sum of c. plus (d. times e.)];

g. the total combined HAP emissions from all materials employed, in tons per month (the sum of all HAPs as calculated in f.);

h. the updated rolling, 12-month summation of each individual HAP emissions, in pounds or tons. This shall include the information for the current month and the preceding eleven calender months ; and

i. the updated rolling, 12-month summation of total combined HAP emissions, in pounds or tons. This shall include the information for the current month and the preceding eleven calender months.

* A listing of the HAPs can be found in Section 112(b) of the Clean Air Act or can be obtained by contacting your Hamilton County Department of Environmental Services contact. This information does not have to be kept on a individual emissions unit basis.

3. The permit to install for emissions units P024 - P035 and P051 - P074 was evaluated based on the actual materials (typically coatings and cleanup materials) and the design parameters of the emissions unit's exhaust systems, as specified by the permittee in the permit to install application. The Ohio EPA's "Review of New Sources of Air Toxic Emissions" policy ("Air Toxic Policy") was applied for each pollutant emitted by this emissions unit using data from the permit to install application and the SCREEN 3.0 model (or other Ohio EPA approved model). The predicted 1-hour maximum ground-level concentration from the use of the SCREEN 3.0 model was compared to the Maximum Ground-Level Concentration (MAGLC).

The following summarizes the results of the modeling for the "worst case" pollutant(s):

Pollutant: HCl (CAS 7647-01-0)

TLV (ug/m^3): 2198

Maximum Hourly Emission Rate (lbs/hr): 0.132 lbs/hr HCl, P024 - P035 and P051 - P074, combined

Predicted 1-Hour Maximum Ground-Level Concentration (ug/m^3): 30.68 Ug/m^3, P024 - P035 and P051 - P074, combined

MAGLC (ug/m^3): 52.33

Physical changes to or in the method of operation of the emissions unit after it's installation or modification could affect the parameters used to determine whether or not the "Air Toxics Policy" is satisfied. Consequently, prior to making a change that could impact such parameters, the permittee shall conduct an evaluation to determine that the "Air Toxic Policy" will still be satisfied. If, upon evaluation, the permittee determines that the "Air Toxic Policy" will not be satisfied, the permittee will not make the change. Changes that can affect the parameters used in the "Air Toxic Policy" include the following:

a. changes in the composition of the materials used (typically for coatings or cleanup materials), or the use of new materials, that would result in the emission of a compound with a lower Threshold Limit Value (TLV), as indicated in the most recent version of the handbook entitled "American Conference of Governmental Industrial Hygienists (ACGIH)," than the lowest TLV value previously modeled;

b. changes in the composition of the materials, or use of new materials, that would result in an increase in emissions of any pollutant with a listed TLV that was proposed in the application and modeled; and

c. physical changes to the emissions unit or its exhaust parameters (e.g., increased/decreased exhaust flow, changes in stack height, changes in stack diameter, etc.).

If the permittee determines that the "Air Toxic Policy" will be satisfied for the above changes, the Ohio EPA will not consider the change(s) to be a "modification" under OAC rule 3745-31-01 solely due to the emissions of any type of toxic air contaminant not previously emitted, and a modification of the existing permit to install will not be required, even if the toxic air contaminant emissions are greater than the de minimis level in OAC rule 3745-15-05. If the change(s) is (are) defined as a modification under other provisions of the modification definition, then the permittee shall obtain a final permit to install prior to the change.

The permittee shall collect, record, and retain the following information when it conducts evaluations to determine that the changed emissions unit will satisfy the Air Toxic Policy:"

a. a description of the parameters changed(composition of materials, new pollutants emitted, change in stack/exhaust parameters, etc.);

b. documentation of it's evaluation and determination that the changed emissions unit still satisfies the "Air Toxic Policy"; and

c. when the computer modeling is performed, a copy of the resulting computer model runs that show the results of the application of the "Air Toxic Policy" for the change.

D. Reporting Requirements

1. The permittee shall submit quarterly deviation (excursion) reports to the Hamilton County Department of Environmental Services that identify all periods of time during which the following scrubber parameters were not maintained within the requirements of the Operational Restrictions:

   a. the scrubber water recirculation flow rate; and

   b. the scrubber solution pH.

   If no exceedances occurred during the reporting period then a report is required stating so. These reports shall be submitted by January 31, April 30, July 31, and October 31 of each year and shall cover the previous calendar quarters.

2. The permittee shall notify the Hamilton County Department of Environmental Services of any exceedance of the HAP emissions limitations set forth in term A.2.b. The reports shall be submitted to the Director (the Hamilton County Department of Environmental Services) by January 31, April 30, July 31 and October 31 of each year and shall cover the previous three calendar months (October through December, January through March, April through June and July through September, respectively.)

   If no exceedances occurred, the permittee shall state so in the report.

E. Testing Requirements

1. Emissions Limitations

   The hydrochloric acid (HCl) emissions shall not exceed 0.009 pound per hour (lb/hr)
   The hydrochloric acid (HCl) emissions shall not exceed 0.040 Tons per Year (TPY)

   Applicable Compliance Methods

Compliance with the hourly HCl emissions limitation shall be determined by the following calculations:

a. for the conversion of TCS to HCl in the scrubber:

actual trichlorosilane usage (lbs TCS/hr) x unit conversion trichlorosilane (1 mole TCS/135.4524 gMW TCS) x stoichiometric ratio (3 moles HCl/1 mole TCS) x unit conversion HCl (36.3609 gMW HCL/1 mole HCl) = lbs HCl/hr

b. for the addition of HCl in the hi-etch process:

actual cycle time (min/cycle) x actual production rate (cycles/hr) x actual flow rate (liters HCl/hr) x conversion factor (ft3/28.3168 liters) x conversion factor (1 lb HCl/9.7752 ft3 HCl) = lbs HCl/hr; and

c. (lbs HCl/hr from the conversion of TCS + lbs HCl/hr from the addition of HCl) x scrubber efficiency (1 - 99.5/100) = lbs HCl/hr from the scrubber stack

Compliance with the annual HCl emissions limitation shall be determined by the recordkeeping requirement in T&C C.2.h.

2. Emissions Limitation

Visible particulate emissions from any stack associated with emissions unit P030 shall not exceed 20 percent opacity, as a six-minute average, except as specified by rule

Applicable Compliance Method

Compliance shall be determined in accordance with Test Method 9 as set forth in "Appendix on Test Methods" in 40 CFR, Part 60 ("Standards of Performance for New Stationary Sources"), as such Appendix existed on July 1, 1996.

3. Emissions Limitations

9.9 TPY for any single HAP and 24.9 TPY for any combination of HAPs

Compliance with the HAPs emissions limits outlined in T&C A.2.b. shall be demonstrated by the recordkeeping requirements in T&C C.2.

4. Compliance with the operational restrictions for the wet scrubber in T&Cs B.1. and B.2. shall be demonstrated by the recordkeeping requirements in T&C C.1.

F. Miscellaneous Requirements

1. The following terms and conditions of this permit are federally enforceable: A, B, C.1, C.2, D and E.

PART II - SPECIAL TERMS AND CONDITIONS FOR SPECIFIC EMISSIONS UNIT(S)

A. Applicable Emissions Limitations and/or Control Requirements

1. The specific operations(s), property, and/or equipment which constitute this emissions unit are listed in the following table along with the applicable rules and/or requirements and with the applicable emissions limitations and/or control measures. Emissions from this unit shall not exceed the listed limitations, and the listed control measures shall be specified in narrative form following the table.

Operations, Property, and/or Equipment	Applicable Rules/Requirements	OAC rule 3745-17-11(B)
P031 - E08 - EpiPro Pancake Reactor; CS-2 Plant-wide condenser, scrubber, and hydrogen recovery unit	OAC rule 3745-31-05(A)(3)	
	OAC rule 3745-31-05(C) (to avoid being subject to OAC rules 3745-31-28 and Title V permitting requirements)	
	OAC rule 3745-17-07(A)(1)	

Applicable Emissions Limitations/Control Measures	
The hydrochloric acid (HCl) emissions shall not exceed 0.009 pound per hour (lb/hr).	
The hydrochloric acid (HCl) emissions shall not exceed 0.040 Tons per Year (TPY).	See T&C A.2.c.
The requirements of this rule also include compliance with the requirements of OAC rule 3745-31-05(C) and OAC rule 3745-17-07(A)(1).	See T&C A.2.b.
Visible particulate emissions from any stack associated with emissions unit P031 shall not exceed 20 percent opacity, as a six-minute average, except as specified by rule.	
The emission limitation specified by this rule is less stringent than the emission limitation established pursuant to OAC rule 3745-31-05(A)(3).	

2. Additional Terms and Conditions

2.a The hourly emission limitations outlined in term A.1. are based upon the emissions unit's

potential to emit. Therefore, no hourly records are required to demonstrate compliance with these limits.

2.b The actual emissions of Hazardous Air Pollutants (HAPs), as identified in Section 112(b) of Title III of the Clean Air Act, from this facility shall not exceed 9.9 TPY for any single HAP and 24.9 TPY for any combination of HAPs. Compliance with the above limitations shall be based on a rolling, 12-month summation. The permittee has existing records to demonstrate compliance with these limits upon issuance of this permit.

2.c Compliance with OAC rule 3745-31-05(A)(3) shall be demonstrated by the use of a wet scrubber, compliance with the HCl emissions limits and compliance with the facility-wide HAPs emissions limits.

B. Operational Restrictions

1. The scrubber water recirculation flow rate shall be continuously maintained at a value of not less than 60 gallons per minute at all times while the emissions unit is in operation.

2. The pH of the scrubbing liquor shall be maintained within the range of 8-13 at all times while the emissions unit is in operation.

C. Monitoring and/or Recordkeeping Requirements

1. The permittee shall properly install, operate and maintain equipment to continuously monitor the scrubber water recirculation flow rate into the scrubber and the pH of the scrubber liquor while the emissions unit is in operation. The monitoring devices and any recorders shall be installed, calibrated, operated and maintained in accordance with the manufacturer's recommendations, instructions and operating manuals.

   The permittee shall collect and record the following information each day:

   a. the scrubber water recirculation flow rate, in gallons per minute, on a once per day basis;

   b. the pH of the scrubber liquor, on a once per day basis; and

   c. the operating times for the capture (collection) system, control device, monitoring equipment, and the associated emissions unit.

2. The permittee shall collect and record the following information each month for the entire facility:

   a. for all epitaxial reactors, the amount of hydrogen chloride (HCl) used (input), in pounds;

b. for all epitaxial reactors, the amount of HCl released from the reaction of trichlorosilane, in pounds;

c. for all epitaxial reactors, the amount of controlled emissions of each HAP, in tons;

d. for all emissions units, the amount of any other material used which contains HAPs, in tons;

e. for all emissions units, the individual HAP content for each HAP of each material used, in percent by weight (ton HAP/ton material);

f. the total individual HAP emissions for each HAP from all materials employed, in tons per month [for each HAP the sum of c. plus (d. times e.)];

g. the total combined HAP emissions from all materials employed, in tons per month (the sum of all HAPs as calculated in f.);

h. the updated rolling, 12-month summation of each individual HAP emissions, in pounds or tons. This shall include the information for the current month and the preceding eleven calender months ; and

i. the updated rolling, 12-month summation of total combined HAP emissions, in pounds or tons. This shall include the information for the current month and the preceding eleven calender months.

* A listing of the HAPs can be found in Section 112(b) of the Clean Air Act or can be obtained by contacting your Hamilton County Department of Environmental Services contact. This information does not have to be kept on a individual emissions unit basis.

3. The permit to install for emissions units P024 - P035 and P051 - P074 was evaluated based on the actual materials (typically coatings and cleanup materials) and the design parameters of the emissions unit's exhaust systems, as specified by the permittee in the permit to install application. The Ohio EPA's "Review of New Sources of Air Toxic Emissions" policy ("Air Toxic Policy") was applied for each pollutant emitted by this emissions unit using data from the permit to install application and the SCREEN 3.0 model (or other Ohio EPA approved model). The predicted 1-hour maximum ground-level concentration from the use of the SCREEN 3.0 model was compared to the Maximum Ground-Level Concentration (MAGLC).

The following summarizes the results of the modeling for the "worst case" pollutant(s):

Pollutant: HCl (CAS 7647-01-0)

TLV (ug/m^3): 2198

Maximum Hourly Emission Rate (lbs/hr): 0.132 lbs/hr HCl, P024 - P035 and P051 - P074, combined

Predicted 1-Hour Maximum Ground-Level Concentration (ug/m^3): 30.68 Ug/m^3, P024 - P035 and P051 - P074, combined

MAGLC (ug/m^3): 52.33

Physical changes to or in the method of operation of the emissions unit after it's installation or modification could affect the parameters used to determine whether or not the "Air Toxics Policy" is satisfied. Consequently, prior to making a change that could impact such parameters, the permittee shall conduct an evaluation to determine that the "Air Toxic Policy" will still be satisfied. If, upon evaluation, the permittee determines that the "Air Toxic Policy" will not be satisfied, the permittee will not make the change. Changes that can affect the parameters used in the "Air Toxic Policy" include the following:

a. changes in the composition of the materials used (typically for coatings or cleanup materials), or the use of new materials, that would result in the emission of a compound with a lower Threshold Limit Value (TLV), as indicated in the most recent version of the handbook entitled "American Conference of Governmental Industrial Hygienists (ACGIH)," than the lowest TLV value previously modeled;

b. changes in the composition of the materials, or use of new materials, that would result in an increase in emissions of any pollutant with a listed TLV that was proposed in the application and modeled; and

c. physical changes to the emissions unit or its exhaust parameters (e.g., increased/decreased exhaust flow, changes in stack height, changes in stack diameter, etc.).

If the permittee determines that the "Air Toxic Policy" will be satisfied for the above changes, the Ohio EPA will not consider the change(s) to be a "modification" under OAC rule 3745-31-01 solely due to the emissions of any type of toxic air contaminant not previously emitted, and a modification of the existing permit to install will not be required, even if the toxic air contaminant emissions are greater than the de minimis level in OAC rule 3745-15-05. If the change(s) is (are) defined as a modification under other provisions of the modification definition, then the permittee shall obtain a final permit to install prior to the change.

The permittee shall collect, record, and retain the following information when it conducts evaluations to determine that the changed emissions unit will satisfy the Air Toxic Policy:"

a. a description of the parameters changed(composition of materials, new pollutants emitted, change in stack/exhaust parameters, etc.);

b. documentation of it's evaluation and determination that the changed emissions unit still satisfies the "Air Toxic Policy"; and

c. when the computer modeling is performed, a copy of the resulting computer model runs that show the results of the application of the "Air Toxic Policy" for the change.

D. Reporting Requirements

1. The permittee shall submit quarterly deviation (excursion) reports to the Hamilton County Department of Environmental Services that identify all periods of time during which the following scrubber parameters were not maintained within the requirements of the Operational Restrictions:

   a. the scrubber water recirculation flow rate; and

   b. the scrubber solution pH.

   If no exceedances occurred during the reporting period then a report is required stating so. These reports shall be submitted by January 31, April 30, July 31, and October 31 of each year and shall cover the previous calendar quarters.

2. The permittee shall notify the Hamilton County Department of Environmental Services of any exceedance of the HAP emissions limitations set forth in term A.2.b. The reports shall be submitted to the Director (the Hamilton County Department of Environmental Services) by January 31, April 30, July 31 and October 31 of each year and shall cover the previous three calendar months (October through December, January through March, April through June and July through September, respectively.)

   If no exceedances occurred, the permittee shall state so in the report.

E. Testing Requirements

1. Emissions Limitations

   The hydrochloric acid (HCl) emissions shall not exceed 0.009 pound per hour (lb/hr)
   The hydrochloric acid (HCl) emissions shall not exceed 0.040 Tons per Year (TPY)

   Applicable Compliance Methods

Compliance with the hourly HCl emissions limitation shall be determined by the following calculations:

a. for the conversion of TCS to HCl in the scrubber:

actual trichlorosilane usage (lbs TCS/hr) x unit conversion trichlorosilane (1 mole TCS/135.4524 gMW TCS) x stoichiometric ratio (3 moles HCl/1 mole TCS) x unit conversion HCl (36.3609 gMW HCL/1 mole HCl) = lbs HCl/hr

b. for the addition of HCl in the hi-etch process:

actual cycle time (min/cycle) x actual production rate (cycles/hr) x actual flow rate (liters HCl/hr) x conversion factor (ft3/28.3168 liters) x conversion factor (1 lb HCl/9.7752 ft3 HCl) = lbs HCl/hr; and

c. (lbs HCl/hr from the conversion of TCS + lbs HCl/hr from the addition of HCl) x scrubber efficiency (1 - 99.5/100) = lbs HCl/hr from the scrubber stack

Compliance with the annual HCl emissions limitation shall be determined by the recordkeeping requirement in T&C C.2.h.

2. Emissions Limitation

Visible particulate emissions from any stack associated with emissions unit P031 shall not exceed 20 percent opacity, as a six-minute average, except as specified by rule

Applicable Compliance Method

Compliance shall be determined in accordance with Test Method 9 as set forth in "Appendix on Test Methods" in 40 CFR, Part 60 ("Standards of Performance for New Stationary Sources"), as such Appendix existed on July 1, 1996.

3. Emissions Limitations

9.9 TPY for any single HAP and 24.9 TPY for any combination of HAPs

Compliance with the HAPs emissions limits outlined in T&C A.2.b. shall be demonstrated by the recordkeeping requirements in T&C C.2.

4. Compliance with the operational restrictions for the wet scrubber in T&Cs B.1. and B.2. shall be demonstrated by the recordkeeping requirements in T&C C.1.

F. Miscellaneous Requirements

1. The following terms and conditions of this permit are federally enforceable: A, B, C.1, C.2, D and E.

PART II - SPECIAL TERMS AND CONDITIONS FOR SPECIFIC EMISSIONS UNIT(S)

A. Applicable Emissions Limitations and/or Control Requirements

1. The specific operations(s), property, and/or equipment which constitute this emissions unit are listed in the following table along with the applicable rules and/or requirements and with the applicable emissions limitations and/or control measures. Emissions from this unit shall not exceed the listed limitations, and the listed control measures shall be specified in narrative form following the table.

Operations, Property, and/or Equipment	Applicable Rules/Requirements	OAC rule 3745-17-11(B)
P032 - G01 - Gemini III Pancake Reactor; CS-2 - Plant-wide condenser, scrubber, and hydrogen recovery unit	OAC rule 3745-31-05(A)(3)	
	OAC rule 3745-31-05(C) (to avoid being subject to OAC rules 3745-31-28 and Title V permitting requirements)	
	OAC rule 3745-17-07(A)(1)	

Applicable Emissions Limitations/Control Measures	
The hydrochloric acid (HCl) emissions shall not exceed 0.009 pound per hour (lb/hr).	
The hydrochloric acid (HCl) emissions shall not exceed 0.040 Tons per Year (TPY).	See T&C A.2.c.
The requirements of this rule also include compliance with the requirements of OAC rule 3745-31-05(C) and OAC rule 3745-17-07(A)(1).	See T&C A.2.b.
Visible particulate emissions from any stack associated with emissions unit P032 shall not exceed 20 percent opacity, as a six-minute average, except as specified by rule.	
The emission limitation specified by this rule is less stringent than the emission limitation established pursuant to OAC rule 3745-31-05(A)(3).	

2. Additional Terms and Conditions

2.a The hourly emission limitations outlined in term A.1. are based upon the emissions unit's

potential to emit. Therefore, no hourly records are required to demonstrate compliance with these limits.

2.b The actual emissions of Hazardous Air Pollutants (HAPs), as identified in Section 112(b) of Title III of the Clean Air Act, from this facility shall not exceed 9.9 TPY for any single HAP and 24.9 TPY for any combination of HAPs. Compliance with the above limitations shall be based on a rolling, 12-month summation. The permittee has existing records to demonstrate compliance with these limits upon issuance of this permit.

2.c Compliance with OAC rule 3745-31-05(A)(3) shall be demonstrated by the use of a wet scrubber, compliance with the HCl emissions limits and compliance with the facility-wide HAPs emissions limits.

B. Operational Restrictions

1. The scrubber water recirculation flow rate shall be continuously maintained at a value of not less than 60 gallons per minute at all times while the emissions unit is in operation.

2. The pH of the scrubbing liquor shall be maintained within the range of 8-13 at all times while the emissions unit is in operation.

C. Monitoring and/or Recordkeeping Requirements

1. The permittee shall properly install, operate and maintain equipment to continuously monitor the scrubber water recirculation flow rate into the scrubber and the pH of the scrubber liquor while the emissions unit is in operation. The monitoring devices and any recorders shall be installed, calibrated, operated and maintained in accordance with the manufacturer's recommendations, instructions and operating manuals.

   The permittee shall collect and record the following information each day:

   a. the scrubber water recirculation flow rate, in gallons per minute, on a once per day basis;

   b. the pH of the scrubber liquor, on a once per day basis; and

   c. the operating times for the capture (collection) system, control device, monitoring equipment, and the associated emissions unit.

2. The permittee shall collect and record the following information each month for the entire facility:

   a. for all epitaxial reactors, the amount of hydrogen chloride (HCl) used (input), in pounds;

b. for all epitaxial reactors, the amount of HCl released from the reaction of trichlorosilane, in pounds;

c. for all epitaxial reactors, the amount of controlled emissions of each HAP, in tons;

d. for all emissions units, the amount of any other material used which contains HAPs, in tons;

e. for all emissions units, the individual HAP content for each HAP of each material used, in percent by weight (ton HAP/ton material);

f. the total individual HAP emissions for each HAP from all materials employed, in tons per month [for each HAP the sum of c. plus (d. times e.)];

g. the total combined HAP emissions from all materials employed, in tons per month (the sum of all HAPs as calculated in f.);

h. the updated rolling, 12-month summation of each individual HAP emissions, in pounds or tons. This shall include the information for the current month and the preceding eleven calender months ; and

i. the updated rolling, 12-month summation of total combined HAP emissions, in pounds or tons. This shall include the information for the current month and the preceding eleven calender months.

* A listing of the HAPs can be found in Section 112(b) of the Clean Air Act or can be obtained by contacting your Hamilton County Department of Environmental Services contact. This information does not have to be kept on a individual emissions unit basis.

3. The permit to install for emissions units P024 - P035 and P051 - P074 was evaluated based on the actual materials (typically coatings and cleanup materials) and the design parameters of the emissions unit's exhaust systems, as specified by the permittee in the permit to install application. The Ohio EPA's "Review of New Sources of Air Toxic Emissions" policy ("Air Toxic Policy") was applied for each pollutant emitted by this emissions unit using data from the permit to install application and the SCREEN 3.0 model (or other Ohio EPA approved model). The predicted 1-hour maximum ground-level concentration from the use of the SCREEN 3.0 model was compared to the Maximum Ground-Level Concentration (MAGLC).

The following summarizes the results of the modeling for the "worst case" pollutant(s):

Pollutant: HCl (CAS 7647-01-0)

TLV (ug/m^3): 2198

Maximum Hourly Emission Rate (lbs/hr): 0.132 lbs/hr HCl, P024 - P035 and P051 - P074, combined

Predicted 1-Hour Maximum Ground-Level Concentration (ug/m^3): 30.68 Ug/m^3, P024 - P035 and P051 - P074, combined

MAGLC (ug/m^3): 52.33

Physical changes to or in the method of operation of the emissions unit after it's installation or modification could affect the parameters used to determine whether or not the "Air Toxics Policy" is satisfied. Consequently, prior to making a change that could impact such parameters, the permittee shall conduct an evaluation to determine that the "Air Toxic Policy" will still be satisfied. If, upon evaluation, the permittee determines that the "Air Toxic Policy" will not be satisfied, the permittee will not make the change. Changes that can affect the parameters used in the "Air Toxic Policy" include the following:

a. changes in the composition of the materials used (typically for coatings or cleanup materials), or the use of new materials, that would result in the emission of a compound with a lower Threshold Limit Value (TLV), as indicated in the most recent version of the handbook entitled "American Conference of Governmental Industrial Hygienists (ACGIH)," than the lowest TLV value previously modeled;

b. changes in the composition of the materials, or use of new materials, that would result in an increase in emissions of any pollutant with a listed TLV that was proposed in the application and modeled; and

c. physical changes to the emissions unit or its exhaust parameters (e.g., increased/decreased exhaust flow, changes in stack height, changes in stack diameter, etc.).

If the permittee determines that the "Air Toxic Policy" will be satisfied for the above changes, the Ohio EPA will not consider the change(s) to be a "modification" under OAC rule 3745-31-01 solely due to the emissions of any type of toxic air contaminant not previously emitted, and a modification of the existing permit to install will not be required, even if the toxic air contaminant emissions are greater than the de minimis level in OAC rule 3745-15-05. If the change(s) is (are) defined as a modification under other provisions of the modification definition, then the permittee shall obtain a final permit to install prior to the change.

The permittee shall collect, record, and retain the following information when it conducts evaluations to determine that the changed emissions unit will satisfy the Air Toxic Policy:"

a. a description of the parameters changed(composition of materials, new pollutants emitted, change in stack/exhaust parameters, etc.);

b. documentation of it's evaluation and determination that the changed emissions unit still satisfies the "Air Toxic Policy"; and

c. when the computer modeling is performed, a copy of the resulting computer model runs that show the results of the application of the "Air Toxic Policy" for the change.

D. Reporting Requirements

1. The permittee shall submit quarterly deviation (excursion) reports to the Hamilton County Department of Environmental Services that identify all periods of time during which the following scrubber parameters were not maintained within the requirements of the Operational Restrictions:

   a. the scrubber water recirculation flow rate; and

   b. the scrubber solution pH.

   If no exceedances occurred during the reporting period then a report is required stating so. These reports shall be submitted by January 31, April 30, July 31, and October 31 of each year and shall cover the previous calendar quarters.

2. The permittee shall notify the Hamilton County Department of Environmental Services of any exceedance of the HAP emissions limitations set forth in term A.2.b. The reports shall be submitted to the Director (the Hamilton County Department of Environmental Services) by January 31, April 30, July 31 and October 31 of each year and shall cover the previous three calendar months (October through December, January through March, April through June and July through September, respectively.)

   If no exceedances occurred, the permittee shall state so in the report.

E. Testing Requirements

1. Emissions Limitations

   The hydrochloric acid (HCl) emissions shall not exceed 0.009 pound per hour (lb/hr)
   The hydrochloric acid (HCl) emissions shall not exceed 0.040 Tons per Year (TPY)

   Applicable Compliance Methods

Compliance with the hourly HCl emissions limitation shall be determined by the following calculations:

a. for the conversion of TCS to HCl in the scrubber:

actual trichlorosilane usage (lbs TCS/hr) x unit conversion trichlorosilane (1 mole TCS/135.4524 gMW TCS) x stoichiometric ratio (3 moles HCl/1 mole TCS) x unit conversion HCl (36.3609 gMW HCL/1 mole HCl) = lbs HCl/hr

b. for the addition of HCl in the hi-etch process:

actual cycle time (min/cycle) x actual production rate (cycles/hr) x actual flow rate (liters HCl/hr) x conversion factor (ft3/28.3168 liters) x conversion factor (1 lb HCl/9.7752 ft3 HCl) = lbs HCl/hr; and

c. (lbs HCl/hr from the conversion of TCS + lbs HCl/hr from the addition of HCl) x scrubber efficiency (1 - 99.5/100) = lbs HCl/hr from the scrubber stack

Compliance with the annual HCl emissions limitation shall be determined by the recordkeeping requirement in T&C C.2.h.

2. Emissions Limitation

Visible particulate emissions from any stack associated with emissions unit P032 shall not exceed 20 percent opacity, as a six-minute average, except as specified by rule

Applicable Compliance Method

Compliance shall be determined in accordance with Test Method 9 as set forth in "Appendix on Test Methods" in 40 CFR, Part 60 ("Standards of Performance for New Stationary Sources"), as such Appendix existed on July 1, 1996.

3. Emissions Limitations

9.9 TPY for any single HAP and 24.9 TPY for any combination of HAPs

Compliance with the HAPs emissions limits outlined in T&C A.2.b. shall be demonstrated by the recordkeeping requirements in T&C C.2.

4. Compliance with the operational restrictions for the wet scrubber in T&Cs B.1. and B.2. shall be demonstrated by the recordkeeping requirements in T&C C.1.

F. Miscellaneous Requirements

1. The following terms and conditions of this permit are federally enforceable: A, B, C.1, C.2, D and E.

PART II - SPECIAL TERMS AND CONDITIONS FOR SPECIFIC EMISSIONS UNIT(S)

A. Applicable Emissions Limitations and/or Control Requirements

1. The specific operations(s), property, and/or equipment which constitute this emissions unit are listed in the following table along with the applicable rules and/or requirements and with the applicable emissions limitations and/or control measures. Emissions from this unit shall not exceed the listed limitations, and the listed control measures shall be specified in narrative form following the table.

Operations, Property, and/or Equipment	Applicable Rules/Requirements	OAC rule 3745-17-11(B)
P033 - G02 - Gemini III Pancake Reactor; CS-2 - Plant-wide condenser, scrubber, and hydrogen recovery unit	OAC rule 3745-31-05(A)(3)	
	OAC rule 3745-31-05(C) (to avoid being subject to OAC rules 3745-31-28 and Title V permitting requirements)	
	OAC rule 3745-17-07(A)(1)	

Applicable Emissions Limitations/Control Measures	
The hydrochloric acid (HCl) emissions shall not exceed 0.009 pound per hour (lb/hr).	
The hydrochloric acid (HCl) emissions shall not exceed 0.040 Tons per Year (TPY).	See T&C A.2.c.
The requirements of this rule also include compliance with the requirements of OAC rule 3745-31-05(C) and OAC rule 3745-17-07(A)(1).	See T&C A.2.b.
Visible particulate emissions from any stack associated with emissions unit P033 shall not exceed 20 percent opacity, as a six-minute average, except as specified by rule.	
The emission limitation specified by this rule is less stringent than the emission limitation established pursuant to OAC rule 3745-31-05(A)(3).	

2. Additional Terms and Conditions

2.a The hourly emission limitations outlined in term A.1. are based upon the emissions unit's

potential to emit. Therefore, no hourly records are required to demonstrate compliance with these limits.

2.b The actual emissions of Hazardous Air Pollutants (HAPs), as identified in Section 112(b) of Title III of the Clean Air Act, from this facility shall not exceed 9.9 TPY for any single HAP and 24.9 TPY for any combination of HAPs. Compliance with the above limitations shall be based on a rolling, 12-month summation. The permittee has existing records to demonstrate compliance with these limits upon issuance of this permit.

2.c Compliance with OAC rule 3745-31-05(A)(3) shall be demonstrated by the use of a wet scrubber, compliance with the HCl emissions limits and compliance with the facility-wide HAPs emissions limits.

B. Operational Restrictions

1. The scrubber water recirculation flow rate shall be continuously maintained at a value of not less than 60 gallons per minute at all times while the emissions unit is in operation.

2. The pH of the scrubbing liquor shall be maintained within the range of 8-13 at all times while the emissions unit is in operation.

C. Monitoring and/or Recordkeeping Requirements

1. The permittee shall properly install, operate and maintain equipment to continuously monitor the scrubber water recirculation flow rate into the scrubber and the pH of the scrubber liquor while the emissions unit is in operation. The monitoring devices and any recorders shall be installed, calibrated, operated and maintained in accordance with the manufacturer's recommendations, instructions and operating manuals.

   The permittee shall collect and record the following information each day:

   a. the scrubber water recirculation flow rate, in gallons per minute, on a once per day basis;

   b. the pH of the scrubber liquor, on a once per day basis; and

   c. the operating times for the capture (collection) system, control device, monitoring equipment, and the associated emissions unit.

2. The permittee shall collect and record the following information each month for the entire facility:

   a. for all epitaxial reactors, the amount of hydrogen chloride (HCl) used (input), in pounds;

b. for all epitaxial reactors, the amount of HCl released from the reaction of trichlorosilane, in pounds;

c. for all epitaxial reactors, the amount of controlled emissions of each HAP, in tons;

d. for all emissions units, the amount of any other material used which contains HAPs, in tons;

e. for all emissions units, the individual HAP content for each HAP of each material used, in percent by weight (ton HAP/ton material);

f. the total individual HAP emissions for each HAP from all materials employed, in tons per month [for each HAP the sum of c. plus (d. times e.)];

g. the total combined HAP emissions from all materials employed, in tons per month (the sum of all HAPs as calculated in f.);

h. the updated rolling, 12-month summation of each individual HAP emissions, in pounds or tons. This shall include the information for the current month and the preceding eleven calender months ; and

i. the updated rolling, 12-month summation of total combined HAP emissions, in pounds or tons. This shall include the information for the current month and the preceding eleven calender months.

* A listing of the HAPs can be found in Section 112(b) of the Clean Air Act or can be obtained by contacting your Hamilton County Department of Environmental Services contact. This information does not have to be kept on a individual emissions unit basis.

3. The permit to install for emissions units P024 - P035 and P051 - P074 was evaluated based on the actual materials (typically coatings and cleanup materials) and the design parameters of the emissions unit's exhaust systems, as specified by the permittee in the permit to install application. The Ohio EPA's "Review of New Sources of Air Toxic Emissions" policy ("Air Toxic Policy") was applied for each pollutant emitted by this emissions unit using data from the permit to install application and the SCREEN 3.0 model (or other Ohio EPA approved model). The predicted 1-hour maximum ground-level concentration from the use of the SCREEN 3.0 model was compared to the Maximum Ground-Level Concentration (MAGLC).

The following summarizes the results of the modeling for the "worst case" pollutant(s):

Pollutant: HCl (CAS 7647-01-0)

TLV (ug/m^3): 2198

Maximum Hourly Emission Rate (lbs/hr): 0.132 lbs/hr HCl, P024 - P035 and P051 - P074, combined

Predicted 1-Hour Maximum Ground-Level Concentration (ug/m^3): 30.68 Ug/m^3, P024 - P035 and P051 - P074, combined

MAGLC (ug/m^3): 52.33

Physical changes to or in the method of operation of the emissions unit after it's installation or modification could affect the parameters used to determine whether or not the "Air Toxics Policy" is satisfied. Consequently, prior to making a change that could impact such parameters, the permittee shall conduct an evaluation to determine that the "Air Toxic Policy" will still be satisfied. If, upon evaluation, the permittee determines that the "Air Toxic Policy" will not be satisfied, the permittee will not make the change. Changes that can affect the parameters used in the "Air Toxic Policy" include the following:

a. changes in the composition of the materials used (typically for coatings or cleanup materials), or the use of new materials, that would result in the emission of a compound with a lower Threshold Limit Value (TLV), as indicated in the most recent version of the handbook entitled "American Conference of Governmental Industrial Hygienists (ACGIH)," than the lowest TLV value previously modeled;

b. changes in the composition of the materials, or use of new materials, that would result in an increase in emissions of any pollutant with a listed TLV that was proposed in the application and modeled; and

c. physical changes to the emissions unit or its exhaust parameters (e.g., increased/decreased exhaust flow, changes in stack height, changes in stack diameter, etc.).

If the permittee determines that the "Air Toxic Policy" will be satisfied for the above changes, the Ohio EPA will not consider the change(s) to be a "modification" under OAC rule 3745-31-01 solely due to the emissions of any type of toxic air contaminant not previously emitted, and a modification of the existing permit to install will not be required, even if the toxic air contaminant emissions are greater than the de minimis level in OAC rule 3745-15-05. If the change(s) is (are) defined as a modification under other provisions of the modification definition, then the permittee shall obtain a final permit to install prior to the change.

The permittee shall collect, record, and retain the following information when it conducts evaluations to determine that the changed emissions unit will satisfy the Air Toxic Policy:"

a. a description of the parameters changed(composition of materials, new pollutants emitted, change in stack/exhaust parameters, etc.);

b. documentation of it's evaluation and determination that the changed emissions unit still satisfies the "Air Toxic Policy"; and

c. when the computer modeling is performed, a copy of the resulting computer model runs that show the results of the application of the "Air Toxic Policy" for the change.

D. Reporting Requirements

1. The permittee shall submit quarterly deviation (excursion) reports to the Hamilton County Department of Environmental Services that identify all periods of time during which the following scrubber parameters were not maintained within the requirements of the Operational Restrictions:

   a. the scrubber water recirculation flow rate; and

   b. the scrubber solution pH.

   If no exceedances occurred during the reporting period then a report is required stating so. These reports shall be submitted by January 31, April 30, July 31, and October 31 of each year and shall cover the previous calendar quarters.

2. The permittee shall notify the Hamilton County Department of Environmental Services of any exceedance of the HAP emissions limitations set forth in term A.2.b. The reports shall be submitted to the Director (the Hamilton County Department of Environmental Services) by January 31, April 30, July 31 and October 31 of each year and shall cover the previous three calendar months (October through December, January through March, April through June and July through September, respectively.)

   If no exceedances occurred, the permittee shall state so in the report.

E. Testing Requirements

1. Emissions Limitations

   The hydrochloric acid (HCl) emissions shall not exceed 0.009 pound per hour (lb/hr)
   The hydrochloric acid (HCl) emissions shall not exceed 0.040 Tons per Year (TPY)

   Applicable Compliance Methods

Compliance with the hourly HCl emissions limitation shall be determined by the following calculations:

a. for the conversion of TCS to HCl in the scrubber:

actual trichlorosilane usage (lbs TCS/hr) x unit conversion trichlorosilane (1 mole TCS/135.4524 gMW TCS) x stoichiometric ratio (3 moles HCl/1 mole TCS) x unit conversion HCl (36.3609 gMW HCL/1 mole HCl) = lbs HCl/hr

b. for the addition of HCl in the hi-etch process:

actual cycle time (min/cycle) x actual production rate (cycles/hr) x actual flow rate (liters HCl/hr) x conversion factor (ft3/28.3168 liters) x conversion factor (1 lb HCl/9.7752 ft3 HCl) = lbs HCl/hr; and

c. (lbs HCl/hr from the conversion of TCS + lbs HCl/hr from the addition of HCl) x scrubber efficiency (1 - 99.5/100) = lbs HCl/hr from the scrubber stack

Compliance with the annual HCl emissions limitation shall be determined by the recordkeeping requirement in T&C C.2.h.

2. Emissions Limitation

Visible particulate emissions from any stack associated with emissions unit P033 shall not exceed 20 percent opacity, as a six-minute average, except as specified by rule

Applicable Compliance Method

Compliance shall be determined in accordance with Test Method 9 as set forth in "Appendix on Test Methods" in 40 CFR, Part 60 ("Standards of Performance for New Stationary Sources"), as such Appendix existed on July 1, 1996.

3. Emissions Limitations

9.9 TPY for any single HAP and 24.9 TPY for any combination of HAPs

Compliance with the HAPs emissions limits outlined in T&C A.2.b. shall be demonstrated by the recordkeeping requirements in T&C C.2.

4. Compliance with the operational restrictions for the wet scrubber in T&Cs B.1. and B.2. shall be demonstrated by the recordkeeping requirements in T&C C.1.

F. Miscellaneous Requirements

1. The following terms and conditions of this permit are federally enforceable: A, B, C.1, C.2, D and E.

PART II - SPECIAL TERMS AND CONDITIONS FOR SPECIFIC EMISSIONS UNIT(S)

A. Applicable Emissions Limitations and/or Control Requirements

1. The specific operations(s), property, and/or equipment which constitute this emissions unit are listed in the following table along with the applicable rules and/or requirements and with the applicable emissions limitations and/or control measures. Emissions from this unit shall not exceed the listed limitations, and the listed control measures shall be specified in narrative form following the table.

Operations, Property, and/or Equipment	Applicable Rules/Requirements	OAC rule 3745-17-11(B)
P034 - G03 - Gemini III Pancake Reactor; CS-2 - Plant-wide condenser, scrubber, and hydrogen recovery unit	OAC rule 3745-31-05(A)(3)	
	OAC rule 3745-31-05(C) (to avoid being subject to OAC rules 3745-31-28 and Title V permitting requirements)	
	OAC rule 3745-17-07(A)(1)	

Applicable Emissions Limitations/Control Measures	
The hydrochloric acid (HCl) emissions shall not exceed 0.009 pound per hour (lb/hr).	
The hydrochloric acid (HCl) emissions shall not exceed 0.040 Tons per Year (TPY).	See T&C A.2.c.
The requirements of this rule also include compliance with the requirements of OAC rule 3745-31-05(C) and OAC rule 3745-17-07(A)(1).	See T&C A.2.b.
Visible particulate emissions from any stack associated with emissions unit P034 shall not exceed 20 percent opacity, as a six-minute average, except as specified by rule.	
The emission limitation specified by this rule is less stringent than the emission limitation established pursuant to OAC rule 3745-31-05(A)(3).	

2. Additional Terms and Conditions

2.a The hourly emission limitations outlined in term A.1. are based upon the emissions unit's

potential to emit. Therefore, no hourly records are required to demonstrate compliance with these limits.

2.b The actual emissions of Hazardous Air Pollutants (HAPs), as identified in Section 112(b) of Title III of the Clean Air Act, from this facility shall not exceed 9.9 TPY for any single HAP and 24.9 TPY for any combination of HAPs. Compliance with the above limitations shall be based on a rolling, 12-month summation. The permittee has existing records to demonstrate compliance with these limits upon issuance of this permit.

2.c Compliance with OAC rule 3745-31-05(A)(3) shall be demonstrated by the use of a wet scrubber, compliance with the HCl emissions limits and compliance with the facility-wide HAPs emissions limits.

B. Operational Restrictions

1. The scrubber water recirculation flow rate shall be continuously maintained at a value of not less than 60 gallons per minute at all times while the emissions unit is in operation.

2. The pH of the scrubbing liquor shall be maintained within the range of 8-13 at all times while the emissions unit is in operation.

C. Monitoring and/or Recordkeeping Requirements

1. The permittee shall properly install, operate and maintain equipment to continuously monitor the scrubber water recirculation flow rate into the scrubber and the pH of the scrubber liquor while the emissions unit is in operation. The monitoring devices and any recorders shall be installed, calibrated, operated and maintained in accordance with the manufacturer's recommendations, instructions and operating manuals.

   The permittee shall collect and record the following information each day:

   a. the scrubber water recirculation flow rate, in gallons per minute, on a once per day basis;

   b. the pH of the scrubber liquor, on a once per day basis; and

   c. the operating times for the capture (collection) system, control device, monitoring equipment, and the associated emissions unit.

2. The permittee shall collect and record the following information each month for the entire facility:

   a. for all epitaxial reactors, the amount of hydrogen chloride (HCl) used (input), in pounds;

b. for all epitaxial reactors, the amount of HCl released from the reaction of trichlorosilane, in pounds;

c. for all epitaxial reactors, the amount of controlled emissions of each HAP, in tons;

d. for all emissions units, the amount of any other material used which contains HAPs, in tons;

e. for all emissions units, the individual HAP content for each HAP of each material used, in percent by weight (ton HAP/ton material);

f. the total individual HAP emissions for each HAP from all materials employed, in tons per month [for each HAP the sum of c. plus (d. times e.)];

g. the total combined HAP emissions from all materials employed, in tons per month (the sum of all HAPs as calculated in f.);

h. the updated rolling, 12-month summation of each individual HAP emissions, in pounds or tons. This shall include the information for the current month and the preceding eleven calender months ; and

i. the updated rolling, 12-month summation of total combined HAP emissions, in pounds or tons. This shall include the information for the current month and the preceding eleven calender months.

* A listing of the HAPs can be found in Section 112(b) of the Clean Air Act or can be obtained by contacting your Hamilton County Department of Environmental Services contact. This information does not have to be kept on a individual emissions unit basis.

3. The permit to install for emissions units P024 - P035 and P051 - P074 was evaluated based on the actual materials (typically coatings and cleanup materials) and the design parameters of the emissions unit's exhaust systems, as specified by the permittee in the permit to install application. The Ohio EPA's "Review of New Sources of Air Toxic Emissions" policy ("Air Toxic Policy") was applied for each pollutant emitted by this emissions unit using data from the permit to install application and the SCREEN 3.0 model (or other Ohio EPA approved model). The predicted 1-hour maximum ground-level concentration from the use of the SCREEN 3.0 model was compared to the Maximum Ground-Level Concentration (MAGLC).

Emissions Unit ID: **P034**

The following summarizes the results of the modeling for the "worst case" pollutant(s):

Pollutant: HCl (CAS 7647-01-0)

TLV (ug/m^3): 2198

Maximum Hourly Emission Rate (lbs/hr): 0.132 lbs/hr HCl, P024 - P035 and P051 - P074, combined

Predicted 1-Hour Maximum Ground-Level Concentration (ug/m^3): 30.68 Ug/m^3, P024 - P035 and P051 - P074, combined

MAGLC (ug/m^3): 52.33

Physical changes to or in the method of operation of the emissions unit after it's installation or modification could affect the parameters used to determine whether or not the "Air Toxics Policy" is satisfied. Consequently, prior to making a change that could impact such parameters, the permittee shall conduct an evaluation to determine that the "Air Toxic Policy" will still be satisfied. If, upon evaluation, the permittee determines that the "Air Toxic Policy" will not be satisfied, the permittee will not make the change. Changes that can affect the parameters used in the "Air Toxic Policy" include the following:

a. changes in the composition of the materials used (typically for coatings or cleanup materials), or the use of new materials, that would result in the emission of a compound with a lower Threshold Limit Value (TLV), as indicated in the most recent version of the handbook entitled "American Conference of Governmental Industrial Hygienists (ACGIH)," than the lowest TLV value previously modeled;

b. changes in the composition of the materials, or use of new materials, that would result in an increase in emissions of any pollutant with a listed TLV that was proposed in the application and modeled; and

c. physical changes to the emissions unit or its exhaust parameters (e.g., increased/decreased exhaust flow, changes in stack height, changes in stack diameter, etc.).

If the permittee determines that the "Air Toxic Policy" will be satisfied for the above changes, the Ohio EPA will not consider the change(s) to be a "modification" under OAC rule 3745-31-01 solely due to the emissions of any type of toxic air contaminant not previously emitted, and a modification of the existing permit to install will not be required, even if the toxic air contaminant emissions are greater than the de minimis level in OAC rule 3745-15-05. If the change(s) is (are) defined as a modification under other provisions of the modification definition, then the permittee

shall obtain a final permit to install prior to the change.

The permittee shall collect, record, and retain the following information when it conducts evaluations to determine that the changed emissions unit will satisfy the Air Toxic Policy:"

a. a description of the parameters changed(composition of materials, new pollutants emitted, change in stack/exhaust parameters, etc.);

b. documentation of it's evaluation and determination that the changed emissions unit still satisfies the "Air Toxic Policy"; and

c. when the computer modeling is performed, a copy of the resulting computer model runs that show the results of the application of the "Air Toxic Policy" for the change.

D. Reporting Requirements

1. The permittee shall submit quarterly deviation (excursion) reports to the Hamilton County Department of Environmental Services that identify all periods of time during which the following scrubber parameters were not maintained within the requirements of the Operational Restrictions:

   a. the scrubber water recirculation flow rate; and

   b. the scrubber solution pH.

   If no exceedances occurred during the reporting period then a report is required stating so. These reports shall be submitted by January 31, April 30, July 31, and October 31 of each year and shall cover the previous calendar quarters.

2. The permittee shall notify the Hamilton County Department of Environmental Services of any exceedance of the HAP emissions limitations set forth in term A.2.b. The reports shall be submitted to the Director (the Hamilton County Department of Environmental Services) by January 31, April 30, July 31 and October 31 of each year and shall cover the previous three calendar months (October through December, January through March, April through June and July through September, respectively.)

   If no exceedances occurred, the permittee shall state so in the report.

E. Testing Requirements

1. Emissions Limitations

Emissions Unit ID: **P034**

The hydrochloric acid (HCl) emissions shall not exceed 0.009 pound per hour (lb/hr)
The hydrochloric acid (HCl) emissions shall not exceed 0.040 Tons per Year (TPY)

Applicable Compliance Methods

Compliance with the hourly HCl emissions limitation shall be determined by the following calculations:

a. for the conversion of TCS to HCl in the scrubber:

actual trichlorosilane usage (lbs TCS/hr) x unit conversion trichlorosilane (1 mole TCS/135.4524 gMW TCS) x stoichiometric ratio (3 moles HCl/1 mole TCS) x unit conversion HCl (36.3609 gMW HCL/1 mole HCl) = lbs HCl/hr

b. for the addition of HCl in the hi-etch process:

actual cycle time (min/cycle) x actual production rate (cycles/hr) x actual flow rate (liters HCl/hr) x conversion factor (ft3/28.3168 liters) x conversion factor (1 lb HCl/9.7752 ft3 HCl) = lbs HCl/hr; and

c. (lbs HCl/hr from the conversion of TCS + lbs HCl/hr from the addition of HCl) x scrubber efficiency (1 - 99.5/100) = lbs HCl/hr from the scrubber stack

Compliance with the annual HCl emissions limitation shall be determined by the recordkeeping requirement in T&C C.2.h.

2. Emissions Limitation

Visible particulate emissions from any stack associated with emissions unit P034 shall not exceed 20 percent opacity, as a six-minute average, except as specified by rule

Applicable Compliance Method

Compliance shall be determined in accordance with Test Method 9 as set forth in "Appendix on Test Methods" in 40 CFR, Part 60 ("Standards of Performance for New Stationary Sources"), as such Appendix existed on July 1, 1996.

3. Emissions Limitations

9.9 TPY for any single HAP and 24.9 TPY for any combination of HAPs

Compliance with the HAPs emissions limits outlined in T&C A.2.b. shall be demonstrated by the recordkeeping requirements in T&C C.2.

4. Compliance with the operational restrictions for the wet scrubber in T&Cs B.1. and B.2. shall be demonstrated by the recordkeeping requirements in T&C C.1.

F. Miscellaneous Requirements

1. The following terms and conditions of this permit are federally enforceable: A, B, C.1, C.2, D and E.

PART II - SPECIAL TERMS AND CONDITIONS FOR SPECIFIC EMISSIONS UNIT(S)

A. Applicable Emissions Limitations and/or Control Requirements

1. The specific operations(s), property, and/or equipment which constitute this emissions unit are listed in the following table along with the applicable rules and/or requirements and with the applicable emissions limitations and/or control measures. Emissions from this unit shall not exceed the listed limitations, and the listed control measures shall be specified in narrative form following the table.

Operations, Property, and/or Equipment	Applicable Rules/Requirements	OAC rule 3745-17-11(B)
P035 - G04 - Gemini III Pancake Reactor; CS-2 - Plant-wide condenser, scrubber, and hydrogen recovery unit	OAC rule 3745-31-05(A)(3)	
	OAC rule 3745-31-05(C) (to avoid being subject to OAC rules 3745-31-28 and Title V permitting requirements)	
	OAC rule 3745-17-07(A)(1)	

Applicable Emissions Limitations/Control Measures
The hydrochloric acid (HCl) emissions shall not exceed 0.009 pound per hour (lb/hr).
The hydrochloric acid (HCl) emissions shall not exceed 0.040 Tons per Year (TPY). See T&C A.2.c.
The requirements of this rule also include compliance with the requirements of OAC rule 3745-31-05(C) and OAC rule 3745-17-07(A)(1). See T&C A.2.b.
Visible particulate emissions from any stack associated with emissions unit P035 shall not exceed 20 percent opacity, as a six-minute average, except as specified by rule.
The emission limitation specified by this rule is less stringent than the emission limitation established pursuant to OAC rule 3745-31-05(A)(3).

2. Additional Terms and Conditions

2.a The hourly emission limitations outlined in term A.1. are based upon the emissions unit's

potential to emit. Therefore, no hourly records are required to demonstrate compliance with these limits.

2.b The actual emissions of Hazardous Air Pollutants (HAPs), as identified in Section 112(b) of Title III of the Clean Air Act, from this facility shall not exceed 9.9 TPY for any single HAP and 24.9 TPY for any combination of HAPs. Compliance with the above limitations shall be based on a rolling, 12-month summation. The permittee has existing records to demonstrate compliance with these limits upon issuance of this permit.

2.c Compliance with OAC rule 3745-31-05(A)(3) shall be demonstrated by the use of a wet scrubber, compliance with the HCl emissions limits and compliance with the facility-wide HAPs emissions limits.

B. Operational Restrictions

1. The scrubber water recirculation flow rate shall be continuously maintained at a value of not less than 60 gallons per minute at all times while the emissions unit is in operation.

2. The pH of the scrubbing liquor shall be maintained within the range of 8-13 at all times while the emissions unit is in operation.

C. Monitoring and/or Recordkeeping Requirements

1. The permittee shall properly install, operate and maintain equipment to continuously monitor the scrubber water recirculation flow rate into the scrubber and the pH of the scrubber liquor while the emissions unit is in operation. The monitoring devices and any recorders shall be installed, calibrated, operated and maintained in accordance with the manufacturer's recommendations, instructions and operating manuals.

   The permittee shall collect and record the following information each day:

   a. the scrubber water recirculation flow rate, in gallons per minute, on a once per day basis;

   b. the pH of the scrubber liquor, on a once per day basis; and

   c. the operating times for the capture (collection) system, control device, monitoring equipment, and the associated emissions unit.

2. The permittee shall collect and record the following information each month for the entire facility:

   a. for all epitaxial reactors, the amount of hydrogen chloride (HCl) used (input), in pounds;

b. for all epitaxial reactors, the amount of HCl released from the reaction of trichlorosilane, in pounds;

c. for all epitaxial reactors, the amount of controlled emissions of each HAP, in tons;

d. for all emissions units, the amount of any other material used which contains HAPs, in tons;

e. for all emissions units, the individual HAP content for each HAP of each material used, in percent by weight (ton HAP/ton material);

f. the total individual HAP emissions for each HAP from all materials employed, in tons per month [for each HAP the sum of c. plus (d. times e.)];

g. the total combined HAP emissions from all materials employed, in tons per month (the sum of all HAPs as calculated in f.);

h. the updated rolling, 12-month summation of each individual HAP emissions, in pounds or tons. This shall include the information for the current month and the preceding eleven calender months ; and

i. the updated rolling, 12-month summation of total combined HAP emissions, in pounds or tons. This shall include the information for the current month and the preceding eleven calender months.

* A listing of the HAPs can be found in Section 112(b) of the Clean Air Act or can be obtained by contacting your Hamilton County Department of Environmental Services contact. This information does not have to be kept on a individual emissions unit basis.

3. The permit to install for emissions units P024 - P035 and P051 - P074 was evaluated based on the actual materials (typically coatings and cleanup materials) and the design parameters of the emissions unit's exhaust systems, as specified by the permittee in the permit to install application. The Ohio EPA's "Review of New Sources of Air Toxic Emissions" policy ("Air Toxic Policy") was applied for each pollutant emitted by this emissions unit using data from the permit to install application and the SCREEN 3.0 model (or other Ohio EPA approved model). The predicted 1-hour maximum ground-level concentration from the use of the SCREEN 3.0 model was compared to the Maximum Ground-Level Concentration (MAGLC).

The following summarizes the results of the modeling for the "worst case" pollutant(s):

Pollutant: HCl (CAS 7647-01-0)

TLV (ug/m^3): 2198

Maximum Hourly Emission Rate (lbs/hr): 0.132 lbs/hr HCl, P024 - P035 and P051 - P074, combined

Predicted 1-Hour Maximum Ground-Level Concentration (ug/m^3): 30.68 Ug/m^3, P024 - P035 and P051 - P074, combined

MAGLC (ug/m^3): 52.33

Physical changes to or in the method of operation of the emissions unit after it's installation or modification could affect the parameters used to determine whether or not the "Air Toxics Policy" is satisfied. Consequently, prior to making a change that could impact such parameters, the permittee shall conduct an evaluation to determine that the "Air Toxic Policy" will still be satisfied. If, upon evaluation, the permittee determines that the "Air Toxic Policy" will not be satisfied, the permittee will not make the change. Changes that can affect the parameters used in the "Air Toxic Policy" include the following:

a. changes in the composition of the materials used (typically for coatings or cleanup materials), or the use of new materials, that would result in the emission of a compound with a lower Threshold Limit Value (TLV), as indicated in the most recent version of the handbook entitled "American Conference of Governmental Industrial Hygienists (ACGIH)," than the lowest TLV value previously modeled;

b. changes in the composition of the materials, or use of new materials, that would result in an increase in emissions of any pollutant with a listed TLV that was proposed in the application and modeled; and

c. physical changes to the emissions unit or its exhaust parameters (e.g., increased/decreased exhaust flow, changes in stack height, changes in stack diameter, etc.).

If the permittee determines that the "Air Toxic Policy" will be satisfied for the above changes, the Ohio EPA will not consider the change(s) to be a "modification" under OAC rule 3745-31-01 solely due to the emissions of any type of toxic air contaminant not previously emitted, and a modification of the existing permit to install will not be required, even if the toxic air contaminant emissions are greater than the de minimis level in OAC rule 3745-15-05. If the change(s) is (are) defined as a modification under other provisions of the modification definition, then the permittee shall obtain a final permit to install prior to the change.

The permittee shall collect, record, and retain the following information when it conducts evaluations to determine that the changed emissions unit will satisfy the Air Toxic Policy:"

a. a description of the parameters changed(composition of materials, new pollutants emitted, change in stack/exhaust parameters, etc.);

b. documentation of it's evaluation and determination that the changed emissions unit still satisfies the "Air Toxic Policy"; and

c. when the computer modeling is performed, a copy of the resulting computer model runs that show the results of the application of the "Air Toxic Policy" for the change.

D. Reporting Requirements

1. The permittee shall submit quarterly deviation (excursion) reports to the Hamilton County Department of Environmental Services that identify all periods of time during which the following scrubber parameters were not maintained within the requirements of the Operational Restrictions:

   a. the scrubber water recirculation flow rate; and

   b. the scrubber solution pH.

   If no exceedances occurred during the reporting period then a report is required stating so. These reports shall be submitted by January 31, April 30, July 31, and October 31 of each year and shall cover the previous calendar quarters.

2. The permittee shall notify the Hamilton County Department of Environmental Services of any exceedance of the HAP emissions limitations set forth in term A.2.b. The reports shall be submitted to the Director (the Hamilton County Department of Environmental Services) by January 31, April 30, July 31 and October 31 of each year and shall cover the previous three calendar months (October through December, January through March, April through June and July through September, respectively.)

   If no exceedances occurred, the permittee shall state so in the report.

E. Testing Requirements

1. Emissions Limitations

   The hydrochloric acid (HCl) emissions shall not exceed 0.009 pound per hour (lb/hr)
   The hydrochloric acid (HCl) emissions shall not exceed 0.040 Tons per Year (TPY)

   Applicable Compliance Methods

Compliance with the hourly HCl emissions limitation shall be determined by the following calculations:

a. for the conversion of TCS to HCl in the scrubber:

actual trichlorosilane usage (lbs TCS/hr) x unit conversion trichlorosilane (1 mole TCS/135.4524 gMW TCS) x stoichiometric ratio (3 moles HCl/1 mole TCS) x unit conversion HCl (36.3609 gMW HCL/1 mole HCl) = lbs HCl/hr

b. for the addition of HCl in the hi-etch process:

actual cycle time (min/cycle) x actual production rate (cycles/hr) x actual flow rate (liters HCl/hr) x conversion factor (ft3/28.3168 liters) x conversion factor (1 lb HCl/9.7752 ft3 HCl) = lbs HCl/hr; and

c. (lbs HCl/hr from the conversion of TCS + lbs HCl/hr from the addition of HCl) x scrubber efficiency (1 - 99.5/100) = lbs HCl/hr from the scrubber stack

Compliance with the annual HCl emissions limitation shall be determined by the recordkeeping requirement in T&C C.2.h.

2. Emissions Limitation

Visible particulate emissions from any stack associated with emissions unit P035 shall not exceed 20 percent opacity, as a six-minute average, except as specified by rule

Applicable Compliance Method

Compliance shall be determined in accordance with Test Method 9 as set forth in "Appendix on Test Methods" in 40 CFR, Part 60 ("Standards of Performance for New Stationary Sources"), as such Appendix existed on July 1, 1996.

3. Emissions Limitations

9.9 TPY for any single HAP and 24.9 TPY for any combination of HAPs

Compliance with the HAPs emissions limits outlined in T&C A.2.b. shall be demonstrated by the recordkeeping requirements in T&C C.2.

4. Compliance with the operational restrictions for the wet scrubber in T&Cs B.1. and B.2. shall be demonstrated by the recordkeeping requirements in T&C C.1.

F. Miscellaneous Requirements

1. The following terms and conditions of this permit are federally enforceable: A, B, C.1, C.2, D and E.

PART II - SPECIAL TERMS AND CONDITIONS FOR SPECIFIC EMISSIONS UNIT(S)

A. Applicable Emissions Limitations and/or Control Requirements

1. The specific operations(s), property, and/or equipment which constitute this emissions unit are listed in the following table along with the applicable rules and/or requirements and with the applicable emissions limitations and/or control measures. Emissions from this unit shall not exceed the listed limitations, and the listed control measures shall be specified in narrative form following the table.

Operations, Property, and/or Equipment	Applicable Rules/Requirements	OAC rule 3745-17-11(B)
P036 - A01 - ASM Single Wafer Reactor; S01 - OTE Fume Scrubber	OAC rule 3745-31-05(A)(3)	
	OAC rule 3745-31-05(C) (to avoid being subject to OAC rules 3745-31-28 and Title V permitting requirements)	
	OAC rule 3745-17-07(A)(1)	

Applicable Emissions Limitations/Control Measures
The hydrochloric acid (HCl) emissions shall not exceed 0.007 pound per hour (lb/hr).
The hydrochloric acid (HCl) emissions shall not exceed 0.032 Tons per Year (TPY). See T&C A.2.c.
The requirements of this rule also include compliance with the requirements of OAC rule 3745-31-05(C) and OAC rule 3745-17-07(A)(1). See T&C A.2.b.
Visible particulate emissions from any stack associated with emissions unit P036 shall not exceed 20 percent opacity, as a six-minute average, except as specified by rule.
The emission limitation specified by this rule is less stringent than the emission limitation established pursuant to OAC rule 3745-31-05(A)(3).

2. Additional Terms and Conditions

2.a The hourly emission limitations outlined in term A.1. are based upon the emissions unit's

potential to emit. Therefore, no hourly records are required to demonstrate compliance with these limits.

2.b The actual emissions of Hazardous Air Pollutants (HAPs), as identified in Section 112(b) of Title III of the Clean Air Act, from this facility shall not exceed 9.9 TPY for any single HAP and 24.9 TPY for any combination of HAPs. Compliance with the above limitations shall be based on a rolling, 12-month summation. The permittee has existing records to demonstrate compliance with these limits upon issuance of this permit.

2.c Compliance with OAC rule 3745-31-05(A)(3) shall be demonstrated by the use of a wet scrubber, compliance with the HCl emissions limits and compliance with the facility-wide HAPs emissions limits.

B. Operational Restrictions

1. The scrubber water recirculation flow rate shall be continuously maintained at a value of not less than 10 gallons per minute at all times while the emissions unit is in operation.

2. The scrubber water make-up flow rate shall be continuously maintained at a value of not less than 1 gallon per minute at all times while the emissions unit is in operation.

C. Monitoring and/or Recordkeeping Requirements

1. The permittee shall properly install, operate and maintain equipment to continuously monitor the scrubber water recirculation flow rate and the scrubber water make-up flow rate into the scrubber while the emissions unit is in operation. The monitoring devices and any recorders shall be installed, calibrated, operated and maintained in accordance with the manufacturer's recommendations, instructions and operating manuals.

   The permittee shall collect and record the following information each day:

   a. the scrubber water recirculation flow rate, in gallons per minute, on a once per day basis;

   b. the scrubber water make-up flow rate, in gallons per minute, on a once per day basis; and

   c. the operating times for the capture (collection) system, control device, monitoring equipment, and the associated emissions unit.

2. The permittee shall collect and record the following information each month for the entire facility:

   a. for all epitaxial reactors, the amount of hydrogen chloride (HCl) used (input), in pounds;

b. for all epitaxial reactors, the amount of HCl released from the reaction of trichlorosilane, in pounds;

c. for all epitaxial reactors, the amount of controlled emissions of each HAP, in tons;

d. for all emissions units, the amount of any other material used which contains HAPs, in tons;

e. for all emissions units, the individual HAP content for each HAP of each material used, in percent by weight (ton HAP/ton material);

f. the total individual HAP emissions for each HAP from all materials employed, in tons per month [for each HAP the sum of c. plus (d. times e.)];

g. the total combined HAP emissions from all materials employed, in tons per month (the sum of all HAPs as calculated in f.);

h. the updated rolling, 12-month summation of each individual HAP emissions, in pounds or tons. This shall include the information for the current month and the preceding eleven calender months ; and

i. the updated rolling, 12-month summation of total combined HAP emissions, in pounds or tons. This shall include the information for the current month and the preceding eleven calender months.

* A listing of the HAPs can be found in Section 112(b) of the Clean Air Act or can be obtained by contacting your Hamilton County Department of Environmental Services contact. This information does not have to be kept on a individual emissions unit basis.

3. The permit to install for emissions units P036 - P050 was evaluated based on the actual materials and the design parameters of the emissions unit's exhaust systems, as specified by the permittee in the permit to install application. The Ohio EPA's "Review of New Sources of Air Toxic Emissions" policy ("Air Toxic Policy") was applied for each pollutant emitted by this emissions unit using data from the permit to install application and the SCREEN 3.0 model (or other Ohio EPA approved model). The predicted 1-hour maximum ground-level concentration from the use of the SCREEN 3.0 model was compared to the Maximum Ground-Level Concentration (MAGLC).

The following summarizes the results of the modeling for the "worst case" pollutant(s):

Pollutant: HCl (CAS 7647-01-0)

TLV (ug/m^3): 2198

Maximum Hourly Emission Rate (lbs/hr): 0.105 lbs/hr HCl, P036 - P050, combined

Predicted 1-Hour Maximum Ground-Level Concentration (ug/m^3): 16.82 Ug/m^3, P036 - P050, combined

MAGLC (ug/m^3): 52.33

Physical changes to or in the method of operation of the emissions unit after it's installation or modification could affect the parameters used to determine whether or not the "Air Toxics Policy" is satisfied. Consequently, prior to making a change that could impact such parameters, the permittee shall conduct an evaluation to determine that the "Air Toxic Policy" will still be satisfied. If, upon evaluation, the permittee determines that the "Air Toxic Policy" will not be satisfied, the permittee will not make the change. Changes that can affect the parameters used in the "Air Toxic Policy" include the following:

a. changes in the composition of the materials used (typically for coatings or cleanup materials), or the use of new materials, that would result in the emission of a compound with a lower Threshold Limit Value (TLV), as indicated in the most recent version of the handbook entitled "American Conference of Governmental Industrial Hygienists (ACGIH)," than the lowest TLV value previously modeled;

b. changes in the composition of the materials, or use of new materials, that would result in an increase in emissions of any pollutant with a listed TLV that was proposed in the application and modeled; and

c. physical changes to the emissions unit or its exhaust parameters (e.g., increased/decreased exhaust flow, changes in stack height, changes in stack diameter, etc.).

If the permittee determines that the "Air Toxic Policy" will be satisfied for the above changes, the Ohio EPA will not consider the change(s) to be a "modification" under OAC rule 3745-31-01 solely due to the emissions of any type of toxic air contaminant not previously emitted, and a modification of the existing permit to install will not be required, even if the toxic air contaminant emissions are greater than the de minimis level in OAC rule 3745-15-05. If the change(s) is (are) defined as a modification under other provisions of the modification definition, then the permittee shall obtain a final permit to install prior to the change.

The permittee shall collect, record, and retain the following information when it conducts evaluations to determine that the changed emissions unit will satisfy the Air Toxic Policy:"

a. a description of the parameters changed(composition of materials, new pollutants emitted, change in stack/exhaust parameters, etc.);

b. documentation of it's evaluation and determination that the changed emissions unit still satisfies the "Air Toxic Policy"; and

c. when the computer modeling is performed, a copy of the resulting computer model runs that show the results of the application of the "Air Toxic Policy" for the change.

D. Reporting Requirements

1. The permittee shall submit quarterly deviation (excursion) reports to the Hamilton County Department of Environmental Services that identify all periods of time during which the following scrubber parameters were not maintained at or above the required levels:

   a. the scrubber water recirculation flow rate; and

   b. the scrubber water make-up flow rate.

   If no exceedances occurred during the reporting period then a report is required stating so. These reports shall be submitted by January 31, April 30, July 31, and October 31 of each year and shall cover the previous calendar quarters.

2. The permittee shall notify the Hamilton County Department of Environmental Services of any exceedance of the HAP emissions limitations set forth in term A.2.b. The reports shall be submitted to the Director (the Hamilton County Department of Environmental Services) by January 31, April 30, July 31 and October 31 of each year and shall cover the previous three calendar months (October through December, January through March, April through June and July through September, respectively.)

   If no exceedances occurred, the permittee shall state so in the report.

E. Testing Requirements

1. Emissions Limitations

   The hydrochloric acid (HCl) emissions shall not exceed 0.007 pound per hour (lb/hr)
   The hydrochloric acid (HCl) emissions shall not exceed 0.032 Tons per Year (TPY)

   Applicable Compliance Methods

Compliance with the hourly HCl emissions limitation shall be determined by the following calculations:

a. for the conversion of TCS to HCl in the scrubber:

actual trichlorosilane usage (lbs TCS/hr) x unit conversion trichlorosilane (1 mole TCS/135.4524 gMW TCS) x stoichiometric ratio (3 moles HCl/1 mole TCS) x unit conversion HCl (36.3609 gMW HCL/1 mole HCl) = lbs HCl/hr

b. for the addition of HCl in the hi-etch process:

actual cycle time (min/cycle) x actual production rate (cycles/hr) x actual flow rate (liters HCl/hr) x conversion factor (ft3/28.3168 liters) x conversion factor (1 lb HCl/9.7752 ft3 HCl) = lbs HCl/hr; and

c. (lbs HCl/hr from the conversion of TCS + lbs HCl/hr from the addition of HCl) x scrubber efficiency (1 - 99.5/100) = lbs HCl/hr from the scrubber stack

Compliance with the annual HCl emissions limitation shall be determined by the recordkeeping requirement in T&C C.2.h.

2. Emissions Limitation

Visible particulate emissions from any stack associated with emissions unit P036 shall not exceed 20 percent opacity, as a six-minute average, except as specified by rule

Applicable Compliance Method

Compliance shall be determined in accordance with Test Method 9 as set forth in "Appendix on Test Methods" in 40 CFR, Part 60 ("Standards of Performance for New Stationary Sources"), as such Appendix existed on July 1, 1996.

3. Emissions Limitations

9.9 TPY for any single HAP and 24.9 TPY for any combination of HAPs

Compliance with the HAPs emissions limits outlined in T&C A.2.b. shall be demonstrated by the recordkeeping requirements in T&C C.2.

4. Compliance with the operational restrictions for the wet scrubber in T&Cs B.1. and B.2. shall be demonstrated by the recordkeeping requirements in T&C C.1.

F. Miscellaneous Requirements

1. The following terms and conditions of this permit are federally enforceable: A, B, C.1, C.2, D and E.

PART II - SPECIAL TERMS AND CONDITIONS FOR SPECIFIC EMISSIONS UNIT(S)

A. Applicable Emissions Limitations and/or Control Requirements

1. The specific operations(s), property, and/or equipment which constitute this emissions unit are listed in the following table along with the applicable rules and/or requirements and with the applicable emissions limitations and/or control measures. Emissions from this unit shall not exceed the listed limitations, and the listed control measures shall be specified in narrative form following the table.

Operations, Property, and/or Equipment	Applicable Rules/Requirements	OAC rule 3745-17-11(B)
P037 - A02 - ASM Single Wafer Reactor; S02 - OTE Fume Scrubber	OAC rule 3745-31-05(A)(3)	
	OAC rule 3745-31-05(C) (to avoid being subject to OAC rules 3745-31-28 and Title V permitting requirements)	
	OAC rule 3745-17-07(A)(1)	

Applicable Emissions Limitations/Control Measures	
The hydrochloric acid (HCl) emissions shall not exceed 0.007 pound per hour (lb/hr).	
The hydrochloric acid (HCl) emissions shall not exceed 0.032 Tons per Year (TPY).	See T&C A.2.c.
The requirements of this rule also include compliance with the requirements of OAC rule 3745-31-05(C) and OAC rule 3745-17-07(A)(1).	See T&C A.2.b.
Visible particulate emissions from any stack associated with emissions unit P037 shall not exceed 20 percent opacity, as a six-minute average, except as specified by rule.	
The emission limitation specified by this rule is less stringent than the emission limitation established pursuant to OAC rule 3745-31-05(A)(3).	

2. Additional Terms and Conditions

2.a The hourly emission limitations outlined in term A.1. are based upon the emissions unit's

potential to emit. Therefore, no hourly records are required to demonstrate compliance with these limits.

2.b The actual emissions of Hazardous Air Pollutants (HAPs), as identified in Section 112(b) of Title III of the Clean Air Act, from this facility shall not exceed 9.9 TPY for any single HAP and 24.9 TPY for any combination of HAPs. Compliance with the above limitations shall be based on a rolling, 12-month summation. The permittee has existing records to demonstrate compliance with these limits upon issuance of this permit.

2.c Compliance with OAC rule 3745-31-05(A)(3) shall be demonstrated by the use of a wet scrubber, compliance with the HCl emissions limits and compliance with the facility-wide HAPs emissions limits.

B. Operational Restrictions

1. The scrubber water recirculation flow rate shall be continuously maintained at a value of not less than 10 gallons per minute at all times while the emissions unit is in operation.

2. The scrubber water make-up flow rate shall be continuously maintained at a value of not less than 1 gallon per minute at all times while the emissions unit is in operation.

C. Monitoring and/or Recordkeeping Requirements

1. The permittee shall properly install, operate and maintain equipment to continuously monitor the scrubber water recirculation flow rate and the scrubber water make-up flow rate into the scrubber while the emissions unit is in operation. The monitoring devices and any recorders shall be installed, calibrated, operated and maintained in accordance with the manufacturer's recommendations, instructions and operating manuals.

   The permittee shall collect and record the following information each day:

   a. the scrubber water recirculation flow rate, in gallons per minute, on a once per day basis;

   b. the scrubber water make-up flow rate, in gallons per minute, on a once per day basis; and

   c. the operating times for the capture (collection) system, control device, monitoring equipment, and the associated emissions unit.

2. The permittee shall collect and record the following information each month for the entire facility:

   a. for all epitaxial reactors, the amount of hydrogen chloride (HCl) used (input), in pounds;

b. for all epitaxial reactors, the amount of HCl released from the reaction of trichlorosilane, in pounds;

c. for all epitaxial reactors, the amount of controlled emissions of each HAP, in tons;

d. for all emissions units, the amount of any other material used which contains HAPs, in tons;

e. for all emissions units, the individual HAP content for each HAP of each material used, in percent by weight (ton HAP/ton material);

f. the total individual HAP emissions for each HAP from all materials employed, in tons per month [for each HAP the sum of c. plus (d. times e.)];

g. the total combined HAP emissions from all materials employed, in tons per month (the sum of all HAPs as calculated in f.);

h. the updated rolling, 12-month summation of each individual HAP emissions, in pounds or tons. This shall include the information for the current month and the preceding eleven calender months ; and

i. the updated rolling, 12-month summation of total combined HAP emissions, in pounds or tons. This shall include the information for the current month and the preceding eleven calender months.

* A listing of the HAPs can be found in Section 112(b) of the Clean Air Act or can be obtained by contacting your Hamilton County Department of Environmental Services contact. This information does not have to be kept on a individual emissions unit basis.

3. The permit to install for emissions units P036 - P050 was evaluated based on the actual materials and the design parameters of the emissions unit's exhaust systems, as specified by the permittee in the permit to install application. The Ohio EPA's "Review of New Sources of Air Toxic Emissions" policy ("Air Toxic Policy") was applied for each pollutant emitted by this emissions unit using data from the permit to install application and the SCREEN 3.0 model (or other Ohio EPA approved model). The predicted 1-hour maximum ground-level concentration from the use of the SCREEN 3.0 model was compared to the Maximum Ground-Level Concentration (MAGLC).

The following summarizes the results of the modeling for the "worst case" pollutant(s):

Pollutant: HCl (CAS 7647-01-0)

TLV (ug/m^3): 2198

Maximum Hourly Emission Rate (lbs/hr): 0.105 lbs/hr HCl, P036 - P050, combined

Predicted 1-Hour Maximum Ground-Level Concentration (ug/m^3): 16.82 Ug/m^3, P036 - P050, combined

MAGLC (ug/m^3): 52.33

Physical changes to or in the method of operation of the emissions unit after it's installation or modification could affect the parameters used to determine whether or not the "Air Toxics Policy" is satisfied. Consequently, prior to making a change that could impact such parameters, the permittee shall conduct an evaluation to determine that the "Air Toxic Policy" will still be satisfied. If, upon evaluation, the permittee determines that the "Air Toxic Policy" will not be satisfied, the permittee will not make the change. Changes that can affect the parameters used in the "Air Toxic Policy" include the following:

a. changes in the composition of the materials used (typically for coatings or cleanup materials), or the use of new materials, that would result in the emission of a compound with a lower Threshold Limit Value (TLV), as indicated in the most recent version of the handbook entitled "American Conference of Governmental Industrial Hygienists (ACGIH)," than the lowest TLV value previously modeled;

b. changes in the composition of the materials, or use of new materials, that would result in an increase in emissions of any pollutant with a listed TLV that was proposed in the application and modeled; and

c. physical changes to the emissions unit or its exhaust parameters (e.g., increased/decreased exhaust flow, changes in stack height, changes in stack diameter, etc.).

If the permittee determines that the "Air Toxic Policy" will be satisfied for the above changes, the Ohio EPA will not consider the change(s) to be a "modification" under OAC rule 3745-31-01 solely due to the emissions of any type of toxic air contaminant not previously emitted, and a modification of the existing permit to install will not be required, even if the toxic air contaminant emissions are greater than the de minimis level in OAC rule 3745-15-05. If the change(s) is (are) defined as a modification under other provisions of the modification definition, then the permittee shall obtain a final permit to install prior to the change.

The permittee shall collect, record, and retain the following information when it conducts evaluations to determine that the changed emissions unit will satisfy the Air Toxic Policy:"

a. a description of the parameters changed(composition of materials, new pollutants emitted, change in stack/exhaust parameters, etc.);

b. documentation of it's evaluation and determination that the changed emissions unit still satisfies the "Air Toxic Policy"; and

c. when the computer modeling is performed, a copy of the resulting computer model runs that show the results of the application of the "Air Toxic Policy" for the change.

D. Reporting Requirements

1. The permittee shall submit quarterly deviation (excursion) reports to the Hamilton County Department of Environmental Services that identify all periods of time during which the following scrubber parameters were not maintained at or above the required levels:

   a. the scrubber water recirculation flow rate; and

   b. the scrubber water make-up flow rate.

   If no exceedances occurred during the reporting period then a report is required stating so. These reports shall be submitted by January 31, April 30, July 31, and October 31 of each year and shall cover the previous calendar quarters.

2. The permittee shall notify the Hamilton County Department of Environmental Services of any exceedance of the HAP emissions limitations set forth in term A.2.b. The reports shall be submitted to the Director (the Hamilton County Department of Environmental Services) by January 31, April 30, July 31 and October 31 of each year and shall cover the previous three calendar months (October through December, January through March, April through June and July through September, respectively.)

   If no exceedances occurred, the permittee shall state so in the report.

E. Testing Requirements

1. Emissions Limitations

   The hydrochloric acid (HCl) emissions shall not exceed 0.007 pound per hour (lb/hr)
   The hydrochloric acid (HCl) emissions shall not exceed 0.032 Tons per Year (TPY)

   Applicable Compliance Methods

Compliance with the hourly HCl emissions limitation shall be determined by the following calculations:

a. for the conversion of TCS to HCl in the scrubber:

actual trichlorosilane usage (lbs TCS/hr) x unit conversion trichlorosilane (1 mole TCS/135.4524 gMW TCS) x stoichiometric ratio (3 moles HCl/1 mole TCS) x unit conversion HCl (36.3609 gMW HCL/1 mole HCl) = lbs HCl/hr

b. for the addition of HCl in the hi-etch process:

actual cycle time (min/cycle) x actual production rate (cycles/hr) x actual flow rate (liters HCl/hr) x conversion factor (ft3/28.3168 liters) x conversion factor (1 lb HCl/9.7752 ft3 HCl) = lbs HCl/hr; and

c. (lbs HCl/hr from the conversion of TCS + lbs HCl/hr from the addition of HCl) x scrubber efficiency (1 - 99.5/100) = lbs HCl/hr from the scrubber stack

Compliance with the annual HCl emissions limitation shall be determined by the recordkeeping requirement in T&C C.2.h.

2. Emissions Limitation

Visible particulate emissions from any stack associated with emissions unit P037 shall not exceed 20 percent opacity, as a six-minute average, except as specified by rule

Applicable Compliance Method

Compliance shall be determined in accordance with Test Method 9 as set forth in "Appendix on Test Methods" in 40 CFR, Part 60 ("Standards of Performance for New Stationary Sources"), as such Appendix existed on July 1, 1996.

3. Emissions Limitations

9.9 TPY for any single HAP and 24.9 TPY for any combination of HAPs

Compliance with the HAPs emissions limits outlined in T&C A.2.b. shall be demonstrated by the recordkeeping requirements in T&C C.2.

4. Compliance with the operational restrictions for the wet scrubber in T&Cs B.1. and B.2. shall be demonstrated by the recordkeeping requirements in T&C C.1.

F. Miscellaneous Requirements

1. The following terms and conditions of this permit are federally enforceable: A, B, C.1, C.2, D and E.

PART II - SPECIAL TERMS AND CONDITIONS FOR SPECIFIC EMISSIONS UNIT(S)

A. Applicable Emissions Limitations and/or Control Requirements

1. The specific operations(s), property, and/or equipment which constitute this emissions unit are listed in the following table along with the applicable rules and/or requirements and with the applicable emissions limitations and/or control measures. Emissions from this unit shall not exceed the listed limitations, and the listed control measures shall be specified in narrative form following the table.

Operations, Property, and/or Equipment	Applicable Rules/Requirements	OAC rule 3745-17-11(B)
P038 - A03 - ASM Single Wafer Reactor; S03 - OTE Fume Scrubber	OAC rule 3745-31-05(A)(3)	
	OAC rule 3745-31-05(C) (to avoid being subject to OAC rules 3745-31-28 and Title V permitting requirements)	
	OAC rule 3745-17-07(A)(1)	

Applicable Emissions Limitations/Control Measures
The hydrochloric acid (HCl) emissions shall not exceed 0.007 pound per hour (lb/hr).
The hydrochloric acid (HCl) emissions shall not exceed 0.032 Tons per Year (TPY). See T&C A.2.c.
The requirements of this rule also include compliance with the requirements of OAC rule 3745-31-05(C) and OAC rule 3745-17-07(A)(1). See T&C A.2.b.
Visible particulate emissions from any stack associated with emissions unit P038 shall not exceed 20 percent opacity, as a six-minute average, except as specified by rule.
The emission limitation specified by this rule is less stringent than the emission limitation established pursuant to OAC rule 3745-31-05(A)(3).

2. Additional Terms and Conditions

2.a The hourly emission limitations outlined in term A.1. are based upon the emissions unit's

potential to emit. Therefore, no hourly records are required to demonstrate compliance with these limits.

2.b The actual emissions of Hazardous Air Pollutants (HAPs), as identified in Section 112(b) of Title III of the Clean Air Act, from this facility shall not exceed 9.9 TPY for any single HAP and 24.9 TPY for any combination of HAPs. Compliance with the above limitations shall be based on a rolling, 12-month summation. The permittee has existing records to demonstrate compliance with these limits upon issuance of this permit.

2.c Compliance with OAC rule 3745-31-05(A)(3) shall be demonstrated by the use of a wet scrubber, compliance with the HCl emissions limits and compliance with the facility-wide HAPs emissions limits.

B. Operational Restrictions

1. The scrubber water recirculation flow rate shall be continuously maintained at a value of not less than 10 gallons per minute at all times while the emissions unit is in operation.

2. The scrubber water make-up flow rate shall be continuously maintained at a value of not less than 1 gallon per minute at all times while the emissions unit is in operation.

C. Monitoring and/or Recordkeeping Requirements

1. The permittee shall properly install, operate and maintain equipment to continuously monitor the scrubber water recirculation flow rate and the scrubber water make-up flow rate into the scrubber while the emissions unit is in operation. The monitoring devices and any recorders shall be installed, calibrated, operated and maintained in accordance with the manufacturer's recommendations, instructions and operating manuals.

   The permittee shall collect and record the following information each day:

   a. the scrubber water recirculation flow rate, in gallons per minute, on a once per day basis;

   b. the scrubber water make-up flow rate, in gallons per minute, on a once per day basis; and

   c. the operating times for the capture (collection) system, control device, monitoring equipment, and the associated emissions unit.

2. The permittee shall collect and record the following information each month for the entire facility:

   a. for all epitaxial reactors, the amount of hydrogen chloride (HCl) used (input), in pounds;

b. for all epitaxial reactors, the amount of HCl released from the reaction of trichlorosilane, in pounds;

c. for all epitaxial reactors, the amount of controlled emissions of each HAP, in tons;

d. for all emissions units, the amount of any other material used which contains HAPs, in tons;

e. for all emissions units, the individual HAP content for each HAP of each material used, in percent by weight (ton HAP/ton material);

f. the total individual HAP emissions for each HAP from all materials employed, in tons per month [for each HAP the sum of c. plus (d. times e.)];

g. the total combined HAP emissions from all materials employed, in tons per month (the sum of all HAPs as calculated in f.);

h. the updated rolling, 12-month summation of each individual HAP emissions, in pounds or tons. This shall include the information for the current month and the preceding eleven calender months ; and

i. the updated rolling, 12-month summation of total combined HAP emissions, in pounds or tons. This shall include the information for the current month and the preceding eleven calender months.

* A listing of the HAPs can be found in Section 112(b) of the Clean Air Act or can be obtained by contacting your Hamilton County Department of Environmental Services contact. This information does not have to be kept on a individual emissions unit basis.

3. The permit to install for emissions units P036 - P050 was evaluated based on the actual materials and the design parameters of the emissions unit's exhaust systems, as specified by the permittee in the permit to install application. The Ohio EPA's "Review of New Sources of Air Toxic Emissions" policy ("Air Toxic Policy") was applied for each pollutant emitted by this emissions unit using data from the permit to install application and the SCREEN 3.0 model (or other Ohio EPA approved model). The predicted 1-hour maximum ground-level concentration from the use of the SCREEN 3.0 model was compared to the Maximum Ground-Level Concentration (MAGLC).

The following summarizes the results of the modeling for the "worst case" pollutant(s):

Pollutant: HCl (CAS 7647-01-0)

TLV (ug/m^3): 2198

Maximum Hourly Emission Rate (lbs/hr): 0.105 lbs/hr HCl, P036 - P050, combined

Predicted 1-Hour Maximum Ground-Level Concentration (ug/m^3): 16.82 Ug/m^3, P036 - P050, combined

MAGLC (ug/m^3): 52.33

Physical changes to or in the method of operation of the emissions unit after it's installation or modification could affect the parameters used to determine whether or not the "Air Toxics Policy" is satisfied. Consequently, prior to making a change that could impact such parameters, the permittee shall conduct an evaluation to determine that the "Air Toxic Policy" will still be satisfied. If, upon evaluation, the permittee determines that the "Air Toxic Policy" will not be satisfied, the permittee will not make the change. Changes that can affect the parameters used in the "Air Toxic Policy" include the following:

a. changes in the composition of the materials used (typically for coatings or cleanup materials), or the use of new materials, that would result in the emission of a compound with a lower Threshold Limit Value (TLV), as indicated in the most recent version of the handbook entitled "American Conference of Governmental Industrial Hygienists (ACGIH)," than the lowest TLV value previously modeled;

b. changes in the composition of the materials, or use of new materials, that would result in an increase in emissions of any pollutant with a listed TLV that was proposed in the application and modeled; and

c. physical changes to the emissions unit or its exhaust parameters (e.g., increased/decreased exhaust flow, changes in stack height, changes in stack diameter, etc.).

If the permittee determines that the "Air Toxic Policy" will be satisfied for the above changes, the Ohio EPA will not consider the change(s) to be a "modification" under OAC rule 3745-31-01 solely due to the emissions of any type of toxic air contaminant not previously emitted, and a modification of the existing permit to install will not be required, even if the toxic air contaminant emissions are greater than the de minimis level in OAC rule 3745-15-05. If the change(s) is (are) defined as a modification under other provisions of the modification definition, then the permittee shall obtain a final permit to install prior to the change.

The permittee shall collect, record, and retain the following information when it conducts evaluations to determine that the changed emissions unit will satisfy the Air Toxic Policy:"

a. a description of the parameters changed(composition of materials, new pollutants emitted, change in stack/exhaust parameters, etc.);

b. documentation of it's evaluation and determination that the changed emissions unit still satisfies the "Air Toxic Policy"; and

c. when the computer modeling is performed, a copy of the resulting computer model runs that show the results of the application of the "Air Toxic Policy" for the change.

D. Reporting Requirements

1. The permittee shall submit quarterly deviation (excursion) reports to the Hamilton County Department of Environmental Services that identify all periods of time during which the following scrubber parameters were not maintained at or above the required levels:

   a. the scrubber water recirculation flow rate; and

   b. the scrubber water make-up flow rate.

   If no exceedances occurred during the reporting period then a report is required stating so. These reports shall be submitted by January 31, April 30, July 31, and October 31 of each year and shall cover the previous calendar quarters.

2. The permittee shall notify the Hamilton County Department of Environmental Services of any exceedance of the HAP emissions limitations set forth in term A.2.b. The reports shall be submitted to the Director (the Hamilton County Department of Environmental Services) by January 31, April 30, July 31 and October 31 of each year and shall cover the previous three calendar months (October through December, January through March, April through June and July through September, respectively.)

   If no exceedances occurred, the permittee shall state so in the report.

E. Testing Requirements

1. Emissions Limitations

   The hydrochloric acid (HCl) emissions shall not exceed 0.007 pound per hour (lb/hr)
   The hydrochloric acid (HCl) emissions shall not exceed 0.032 Tons per Year (TPY)

   Applicable Compliance Methods

Compliance with the hourly HCl emissions limitation shall be determined by the following calculations:

a. for the conversion of TCS to HCl in the scrubber:

actual trichlorosilane usage (lbs TCS/hr) x unit conversion trichlorosilane (1 mole TCS/135.4524 gMW TCS) x stoichiometric ratio (3 moles HCl/1 mole TCS) x unit conversion HCl (36.3609 gMW HCL/1 mole HCl) = lbs HCl/hr

b. for the addition of HCl in the hi-etch process:

actual cycle time (min/cycle) x actual production rate (cycles/hr) x actual flow rate (liters HCl/hr) x conversion factor (ft3/28.3168 liters) x conversion factor (1 lb HCl/9.7752 ft3 HCl) = lbs HCl/hr; and

c. (lbs HCl/hr from the conversion of TCS + lbs HCl/hr from the addition of HCl) x scrubber efficiency (1 - 99.5/100) = lbs HCl/hr from the scrubber stack

Compliance with the annual HCl emissions limitation shall be determined by the recordkeeping requirement in T&C C.2.h.

2. Emissions Limitation

Visible particulate emissions from any stack associated with emissions unit P038 shall not exceed 20 percent opacity, as a six-minute average, except as specified by rule

Applicable Compliance Method

Compliance shall be determined in accordance with Test Method 9 as set forth in "Appendix on Test Methods" in 40 CFR, Part 60 ("Standards of Performance for New Stationary Sources"), as such Appendix existed on July 1, 1996.

3. Emissions Limitations

9.9 TPY for any single HAP and 24.9 TPY for any combination of HAPs

Compliance with the HAPs emissions limits outlined in T&C A.2.b. shall be demonstrated by the recordkeeping requirements in T&C C.2.

4. Compliance with the operational restrictions for the wet scrubber in T&Cs B.1. and B.2. shall be demonstrated by the recordkeeping requirements in T&C C.1.

Emissions Unit ID: **P038**

F. Miscellaneous Requirements

1. The following terms and conditions of this permit are federally enforceable: A, B, C.1, C.2, D and E.

PART II - SPECIAL TERMS AND CONDITIONS FOR SPECIFIC EMISSIONS UNIT(S)

A. Applicable Emissions Limitations and/or Control Requirements

1. The specific operations(s), property, and/or equipment which constitute this emissions unit are listed in the following table along with the applicable rules and/or requirements and with the applicable emissions limitations and/or control measures. Emissions from this unit shall not exceed the listed limitations, and the listed control measures shall be specified in narrative form following the table.

Operations, Property, and/or Equipment	Applicable Rules/Requirements	OAC rule 3745-17-11(B)
P039 - A04 - ASM Single Wafer Reactor; S04 - OTE Fume Scrubber	OAC rule 3745-31-05(A)(3)	
	OAC rule 3745-31-05(C) (to avoid being subject to OAC rules 3745-31-28 and Title V permitting requirements)	
	OAC rule 3745-17-07(A)(1)	

Applicable Emissions Limitations/Control Measures
The hydrochloric acid (HCl) emissions shall not exceed 0.007 pound per hour (lb/hr).
The hydrochloric acid (HCl) emissions shall not exceed 0.032 Tons per Year (TPY). See T&C A.2.c.
The requirements of this rule also include compliance with the requirements of OAC rule 3745-31-05(C) and OAC rule 3745-17-07(A)(1). See T&C A.2.b.
Visible particulate emissions from any stack associated with emissions unit P039 shall not exceed 20 percent opacity, as a six-minute average, except as specified by rule.
The emission limitation specified by this rule is less stringent than the emission limitation established pursuant to OAC rule 3745-31-05(A)(3).

2. Additional Terms and Conditions

2.a The hourly emission limitations outlined in term A.1. are based upon the emissions unit's

potential to emit. Therefore, no hourly records are required to demonstrate compliance with these limits.

2.b The actual emissions of Hazardous Air Pollutants (HAPs), as identified in Section 112(b) of Title III of the Clean Air Act, from this facility shall not exceed 9.9 TPY for any single HAP and 24.9 TPY for any combination of HAPs. Compliance with the above limitations shall be based on a rolling, 12-month summation. The permittee has existing records to demonstrate compliance with these limits upon issuance of this permit.

2.c Compliance with OAC rule 3745-31-05(A)(3) shall be demonstrated by the use of a wet scrubber, compliance with the HCl emissions limits and compliance with the facility-wide HAPs emissions limits.

B. Operational Restrictions

1. The scrubber water recirculation flow rate shall be continuously maintained at a value of not less than 10 gallons per minute at all times while the emissions unit is in operation.

2. The scrubber water make-up flow rate shall be continuously maintained at a value of not less than 1 gallon per minute at all times while the emissions unit is in operation.

C. Monitoring and/or Recordkeeping Requirements

1. The permittee shall properly install, operate and maintain equipment to continuously monitor the scrubber water recirculation flow rate and the scrubber water make-up flow rate into the scrubber while the emissions unit is in operation. The monitoring devices and any recorders shall be installed, calibrated, operated and maintained in accordance with the manufacturer's recommendations, instructions and operating manuals.

   The permittee shall collect and record the following information each day:

   a. the scrubber water recirculation flow rate, in gallons per minute, on a once per day basis;

   b. the scrubber water make-up flow rate, in gallons per minute, on a once per day basis; and

   c. the operating times for the capture (collection) system, control device, monitoring equipment, and the associated emissions unit.

2. The permittee shall collect and record the following information each month for the entire facility:

   a. for all epitaxial reactors, the amount of hydrogen chloride (HCl) used (input), in pounds;

b. for all epitaxial reactors, the amount of HCl released from the reaction of trichlorosilane, in pounds;

c. for all epitaxial reactors, the amount of controlled emissions of each HAP, in tons;

d. for all emissions units, the amount of any other material used which contains HAPs, in tons;

e. for all emissions units, the individual HAP content for each HAP of each material used, in percent by weight (ton HAP/ton material);

f. the total individual HAP emissions for each HAP from all materials employed, in tons per month [for each HAP the sum of c. plus (d. times e.)];

g. the total combined HAP emissions from all materials employed, in tons per month (the sum of all HAPs as calculated in f.);

h. the updated rolling, 12-month summation of each individual HAP emissions, in pounds or tons. This shall include the information for the current month and the preceding eleven calender months ; and

i. the updated rolling, 12-month summation of total combined HAP emissions, in pounds or tons. This shall include the information for the current month and the preceding eleven calender months.

* A listing of the HAPs can be found in Section 112(b) of the Clean Air Act or can be obtained by contacting your Hamilton County Department of Environmental Services contact. This information does not have to be kept on a individual emissions unit basis.

3. The permit to install for emissions units P036 - P050 was evaluated based on the actual materials and the design parameters of the emissions unit's exhaust systems, as specified by the permittee in the permit to install application. The Ohio EPA's "Review of New Sources of Air Toxic Emissions" policy ("Air Toxic Policy") was applied for each pollutant emitted by this emissions unit using data from the permit to install application and the SCREEN 3.0 model (or other Ohio EPA approved model). The predicted 1-hour maximum ground-level concentration from the use of the SCREEN 3.0 model was compared to the Maximum Ground-Level Concentration (MAGLC).

The following summarizes the results of the modeling for the "worst case" pollutant(s):

Pollutant: HCl (CAS 7647-01-0)

TLV (ug/m^3): 2198

Maximum Hourly Emission Rate (lbs/hr): 0.105 lbs/hr HCl, P036 - P050, combined

Predicted 1-Hour Maximum Ground-Level Concentration (ug/m^3): 16.82 Ug/m^3, P036 - P050, combined

MAGLC (ug/m^3): 52.33

Physical changes to or in the method of operation of the emissions unit after it's installation or modification could affect the parameters used to determine whether or not the "Air Toxics Policy" is satisfied. Consequently, prior to making a change that could impact such parameters, the permittee shall conduct an evaluation to determine that the "Air Toxic Policy" will still be satisfied. If, upon evaluation, the permittee determines that the "Air Toxic Policy" will not be satisfied, the permittee will not make the change. Changes that can affect the parameters used in the "Air Toxic Policy" include the following:

a. changes in the composition of the materials used (typically for coatings or cleanup materials), or the use of new materials, that would result in the emission of a compound with a lower Threshold Limit Value (TLV), as indicated in the most recent version of the handbook entitled "American Conference of Governmental Industrial Hygienists (ACGIH)," than the lowest TLV value previously modeled;

b. changes in the composition of the materials, or use of new materials, that would result in an increase in emissions of any pollutant with a listed TLV that was proposed in the application and modeled; and

c. physical changes to the emissions unit or its exhaust parameters (e.g., increased/decreased exhaust flow, changes in stack height, changes in stack diameter, etc.).

If the permittee determines that the "Air Toxic Policy" will be satisfied for the above changes, the Ohio EPA will not consider the change(s) to be a "modification" under OAC rule 3745-31-01 solely due to the emissions of any type of toxic air contaminant not previously emitted, and a modification of the existing permit to install will not be required, even if the toxic air contaminant emissions are greater than the de minimis level in OAC rule 3745-15-05. If the change(s) is (are) defined as a modification under other provisions of the modification definition, then the permittee shall obtain a final permit to install prior to the change.

The permittee shall collect, record, and retain the following information when it conducts evaluations to determine that the changed emissions unit will satisfy the Air Toxic Policy:"

a. a description of the parameters changed(composition of materials, new pollutants emitted, change in stack/exhaust parameters, etc.);

b. documentation of it's evaluation and determination that the changed emissions unit still satisfies the "Air Toxic Policy"; and

c. when the computer modeling is performed, a copy of the resulting computer model runs that show the results of the application of the "Air Toxic Policy" for the change.

D. Reporting Requirements

1. The permittee shall submit quarterly deviation (excursion) reports to the Hamilton County Department of Environmental Services that identify all periods of time during which the following scrubber parameters were not maintained at or above the required levels:

   a. the scrubber water recirculation flow rate; and

   b. the scrubber water make-up flow rate.

   If no exceedances occurred during the reporting period then a report is required stating so. These reports shall be submitted by January 31, April 30, July 31, and October 31 of each year and shall cover the previous calendar quarters.

2. The permittee shall notify the Hamilton County Department of Environmental Services of any exceedance of the HAP emissions limitations set forth in term A.2.b. The reports shall be submitted to the Director (the Hamilton County Department of Environmental Services) by January 31, April 30, July 31 and October 31 of each year and shall cover the previous three calendar months (October through December, January through March, April through June and July through September, respectively.)

   If no exceedances occurred, the permittee shall state so in the report.

E. Testing Requirements

1. Emissions Limitations

   The hydrochloric acid (HCl) emissions shall not exceed 0.007 pound per hour (lb/hr)
   The hydrochloric acid (HCl) emissions shall not exceed 0.032 Tons per Year (TPY)

Applicable Compliance Methods

Compliance with the hourly HCl emissions limitation shall be determined by the following calculations:

a. for the conversion of TCS to HCl in the scrubber:

actual trichlorosilane usage (lbs TCS/hr) x unit conversion trichlorosilane (1 mole TCS/135.4524 gMW TCS) x stoichiometric ratio (3 moles HCl/1 mole TCS) x unit conversion HCl (36.3609 gMW HCL/1 mole HCl) = lbs HCl/hr

b. for the addition of HCl in the hi-etch process:

actual cycle time (min/cycle) x actual production rate (cycles/hr) x actual flow rate (liters HCl/hr) x conversion factor (ft3/28.3168 liters) x conversion factor (1 lb HCl/9.7752 ft3 HCl) = lbs HCl/hr; and

c. (lbs HCl/hr from the conversion of TCS + lbs HCl/hr from the addition of HCl) x scrubber efficiency (1 - 99.5/100) = lbs HCl/hr from the scrubber stack

Compliance with the annual HCl emissions limitation shall be determined by the recordkeeping requirement in T&C C.2.h.

2. Emissions Limitation

Visible particulate emissions from any stack associated with emissions unit P039 shall not exceed 20 percent opacity, as a six-minute average, except as specified by rule

Applicable Compliance Method

Compliance shall be determined in accordance with Test Method 9 as set forth in "Appendix on Test Methods" in 40 CFR, Part 60 ("Standards of Performance for New Stationary Sources"), as such Appendix existed on July 1, 1996.

3. Emissions Limitations

9.9 TPY for any single HAP and 24.9 TPY for any combination of HAPs

Compliance with the HAPs emissions limits outlined in T&C A.2.b. shall be demonstrated by the recordkeeping requirements in T&C C.2.

4. Compliance with the operational restrictions for the wet scrubber in T&Cs B.1. and B.2. shall be demonstrated by the recordkeeping requirements in T&C C.1.

F. Miscellaneous Requirements

1. The following terms and conditions of this permit are federally enforceable: A, B, C.1, C.2, D and E.

PART II - SPECIAL TERMS AND CONDITIONS FOR SPECIFIC EMISSIONS UNIT(S)

A. Applicable Emissions Limitations and/or Control Requirements

1. The specific operations(s), property, and/or equipment which constitute this emissions unit are listed in the following table along with the applicable rules and/or requirements and with the applicable emissions limitations and/or control measures. Emissions from this unit shall not exceed the listed limitations, and the listed control measures shall be specified in narrative form following the table.

Operations, Property, and/or Equipment	Applicable Rules/Requirements	OAC rule 3745-17-11(B)
P040 - A05 - ASM Single Wafer Reactor; S05 - Air Guard Fume Scrubber	OAC rule 3745-31-05(A)(3)	
	OAC rule 3745-31-05(C) (to avoid being subject to OAC rules 3745-31-28 and Title V permitting requirements)	
	OAC rule 3745-17-07(A)(1)	

Applicable Emissions Limitations/Control Measures
The hydrochloric acid (HCl) emissions shall not exceed 0.007 pound per hour (lb/hr).
The hydrochloric acid (HCl) emissions shall not exceed 0.032 Tons per Year (TPY). See T&C A.2.c.
The requirements of this rule also include compliance with the requirements of OAC rule 3745-31-05(C) and OAC rule 3745-17-07(A)(1). See T&C A.2.b.
Visible particulate emissions from any stack associated with emissions unit P040 shall not exceed 20 percent opacity, as a six-minute average, except as specified by rule.
The emission limitation specified by this rule is less stringent than the emission limitation established pursuant to OAC rule 3745-31-05(A)(3).

2. Additional Terms and Conditions

2.a The hourly emission limitations outlined in term A.1. are based upon the emissions unit's

potential to emit. Therefore, no hourly records are required to demonstrate compliance with these limits.

2.b The actual emissions of Hazardous Air Pollutants (HAPs), as identified in Section 112(b) of Title III of the Clean Air Act, from this facility shall not exceed 9.9 TPY for any single HAP and 24.9 TPY for any combination of HAPs. Compliance with the above limitations shall be based on a rolling, 12-month summation. The permittee has existing records to demonstrate compliance with these limits upon issuance of this permit.

2.c Compliance with OAC rule 3745-31-05(A)(3) shall be demonstrated by the use of a wet scrubber, compliance with the HCl emissions limits and compliance with the facility-wide HAPs emissions limits.

B. Operational Restrictions

1. The scrubber water recirculation flow rate shall be continuously maintained at a value of not less than 10 gallons per minute at all times while the emissions unit is in operation.

2. The scrubber water make-up flow rate shall be continuously maintained at a value of not less than 1 gallon per minute at all times while the emissions unit is in operation.

C. Monitoring and/or Recordkeeping Requirements

1. The permittee shall properly install, operate and maintain equipment to continuously monitor the scrubber water recirculation flow rate and the scrubber water make-up flow rate into the scrubber while the emissions unit is in operation. The monitoring devices and any recorders shall be installed, calibrated, operated and maintained in accordance with the manufacturer's recommendations, instructions and operating manuals.

   The permittee shall collect and record the following information each day:

   a. the scrubber water recirculation flow rate, in gallons per minute, on a once per day basis;

   b. the scrubber water make-up flow rate, in gallons per minute, on a once per day basis; and

   c. the operating times for the capture (collection) system, control device, monitoring equipment, and the associated emissions unit.

2. The permittee shall collect and record the following information each month for the entire facility:

   a. for all epitaxial reactors, the amount of hydrogen chloride (HCl) used (input), in pounds;

b. for all epitaxial reactors, the amount of HCl released from the reaction of trichlorosilane, in pounds;

c. for all epitaxial reactors, the amount of controlled emissions of each HAP, in tons;

d. for all emissions units, the amount of any other material used which contains HAPs, in tons;

e. for all emissions units, the individual HAP content for each HAP of each material used, in percent by weight (ton HAP/ton material);

f. the total individual HAP emissions for each HAP from all materials employed, in tons per month [for each HAP the sum of c. plus (d. times e.)];

g. the total combined HAP emissions from all materials employed, in tons per month (the sum of all HAPs as calculated in f.);

h. the updated rolling, 12-month summation of each individual HAP emissions, in pounds or tons. This shall include the information for the current month and the preceding eleven calender months ; and

i. the updated rolling, 12-month summation of total combined HAP emissions, in pounds or tons. This shall include the information for the current month and the preceding eleven calender months.

* A listing of the HAPs can be found in Section 112(b) of the Clean Air Act or can be obtained by contacting your Hamilton County Department of Environmental Services contact. This information does not have to be kept on a individual emissions unit basis.

3. The permit to install for emissions units P036 - P050 was evaluated based on the actual materials and the design parameters of the emissions unit's exhaust systems, as specified by the permittee in the permit to install application. The Ohio EPA's "Review of New Sources of Air Toxic Emissions" policy ("Air Toxic Policy") was applied for each pollutant emitted by this emissions unit using data from the permit to install application and the SCREEN 3.0 model (or other Ohio EPA approved model). The predicted 1-hour maximum ground-level concentration from the use of the SCREEN 3.0 model was compared to the Maximum Ground-Level Concentration (MAGLC).

The following summarizes the results of the modeling for the "worst case" pollutant(s):

Pollutant: HCl (CAS 7647-01-0)

TLV (ug/m^3): 2198

Maximum Hourly Emission Rate (lbs/hr): 0.105 lbs/hr HCl, P036 - P050, combined

Predicted 1-Hour Maximum Ground-Level Concentration (ug/m^3): 16.82 Ug/m^3, P036 - P050, combined

MAGLC (ug/m^3): 52.33

Physical changes to or in the method of operation of the emissions unit after it's installation or modification could affect the parameters used to determine whether or not the "Air Toxics Policy" is satisfied. Consequently, prior to making a change that could impact such parameters, the permittee shall conduct an evaluation to determine that the "Air Toxic Policy" will still be satisfied. If, upon evaluation, the permittee determines that the "Air Toxic Policy" will not be satisfied, the permittee will not make the change. Changes that can affect the parameters used in the "Air Toxic Policy" include the following:

a. changes in the composition of the materials used (typically for coatings or cleanup materials), or the use of new materials, that would result in the emission of a compound with a lower Threshold Limit Value (TLV), as indicated in the most recent version of the handbook entitled "American Conference of Governmental Industrial Hygienists (ACGIH)," than the lowest TLV value previously modeled;

b. changes in the composition of the materials, or use of new materials, that would result in an increase in emissions of any pollutant with a listed TLV that was proposed in the application and modeled; and

c. physical changes to the emissions unit or its exhaust parameters (e.g., increased/decreased exhaust flow, changes in stack height, changes in stack diameter, etc.).

If the permittee determines that the "Air Toxic Policy" will be satisfied for the above changes, the Ohio EPA will not consider the change(s) to be a "modification" under OAC rule 3745-31-01 solely due to the emissions of any type of toxic air contaminant not previously emitted, and a modification of the existing permit to install will not be required, even if the toxic air contaminant emissions are greater than the de minimis level in OAC rule 3745-15-05. If the change(s) is (are) defined as a modification under other provisions of the modification definition, then the permittee shall obtain a final permit to install prior to the change.

The permittee shall collect, record, and retain the following information when it conducts evaluations to determine that the changed emissions unit will satisfy the Air Toxic Policy:"

a. a description of the parameters changed(composition of materials, new pollutants emitted, change in stack/exhaust parameters, etc.);

b. documentation of it's evaluation and determination that the changed emissions unit still satisfies the "Air Toxic Policy"; and

c. when the computer modeling is performed, a copy of the resulting computer model runs that show the results of the application of the "Air Toxic Policy" for the change.

D. Reporting Requirements

1. The permittee shall submit quarterly deviation (excursion) reports to the Hamilton County Department of Environmental Services that identify all periods of time during which the following scrubber parameters were not maintained at or above the required levels:

   a. the scrubber water recirculation flow rate; and

   b. the scrubber water make-up flow rate.

   If no exceedances occurred during the reporting period then a report is required stating so. These reports shall be submitted by January 31, April 30, July 31, and October 31 of each year and shall cover the previous calendar quarters.

2. The permittee shall notify the Hamilton County Department of Environmental Services of any exceedance of the HAP emissions limitations set forth in term A.2.b. The reports shall be submitted to the Director (the Hamilton County Department of Environmental Services) by January 31, April 30, July 31 and October 31 of each year and shall cover the previous three calendar months (October through December, January through March, April through June and July through September, respectively.)

   If no exceedances occurred, the permittee shall state so in the report.

E. Testing Requirements

1. Emissions Limitations

   The hydrochloric acid (HCl) emissions shall not exceed 0.007 pound per hour (lb/hr)
   The hydrochloric acid (HCl) emissions shall not exceed 0.032 Tons per Year (TPY)

   Applicable Compliance Methods

Compliance with the hourly HCl emissions limitation shall be determined by the following calculations:

a. for the conversion of TCS to HCl in the scrubber:

actual trichlorosilane usage (lbs TCS/hr) x unit conversion trichlorosilane (1 mole TCS/135.4524 gMW TCS) x stoichiometric ratio (3 moles HCl/1 mole TCS) x unit conversion HCl (36.3609 gMW HCL/1 mole HCl) = lbs HCl/hr

b. for the addition of HCl in the hi-etch process:

actual cycle time (min/cycle) x actual production rate (cycles/hr) x actual flow rate (liters HCl/hr) x conversion factor (ft3/28.3168 liters) x conversion factor (1 lb HCl/9.7752 ft3 HCl) = lbs HCl/hr; and

c. (lbs HCl/hr from the conversion of TCS + lbs HCl/hr from the addition of HCl) x scrubber efficiency (1 - 99.5/100) = lbs HCl/hr from the scrubber stack

Compliance with the annual HCl emissions limitation shall be determined by the recordkeeping requirement in T&C C.2.h.

2. Emissions Limitation

Visible particulate emissions from any stack associated with emissions unit P040 shall not exceed 20 percent opacity, as a six-minute average, except as specified by rule

Applicable Compliance Method

Compliance shall be determined in accordance with Test Method 9 as set forth in "Appendix on Test Methods" in 40 CFR, Part 60 ("Standards of Performance for New Stationary Sources"), as such Appendix existed on July 1, 1996.

3. Emissions Limitations

9.9 TPY for any single HAP and 24.9 TPY for any combination of HAPs

Compliance with the HAPs emissions limits outlined in T&C A.2.b. shall be demonstrated by the recordkeeping requirements in T&C C.2.

4. Compliance with the operational restrictions for the wet scrubber in T&Cs B.1. and B.2. shall be demonstrated by the recordkeeping requirements in T&C C.1.

F. Miscellaneous Requirements

1. The following terms and conditions of this permit are federally enforceable: A, B, C.1, C.2, D and E.

PART II - SPECIAL TERMS AND CONDITIONS FOR SPECIFIC EMISSIONS UNIT(S)

A. Applicable Emissions Limitations and/or Control Requirements

1. The specific operations(s), property, and/or equipment which constitute this emissions unit are listed in the following table along with the applicable rules and/or requirements and with the applicable emissions limitations and/or control measures. Emissions from this unit shall not exceed the listed limitations, and the listed control measures shall be specified in narrative form following the table.

Operations, Property, and/or Equipment	Applicable Rules/Requirements	OAC rule 3745-17-11(B)
P041 - A06 - ASM Single Wafer Reactor; S06 - Air Guard Fume Scrubber	OAC rule 3745-31-05(A)(3)	
	OAC rule 3745-31-05(C) (to avoid being subject to OAC rules 3745-31-28 and Title V permitting requirements)	
	OAC rule 3745-17-07(A)(1)	

Applicable Emissions Limitations/Control Measures
The hydrochloric acid (HCl) emissions shall not exceed 0.007 pound per hour (lb/hr).
The hydrochloric acid (HCl) emissions shall not exceed 0.032 Tons per Year (TPY). See T&C A.2.c.
The requirements of this rule also include compliance with the requirements of OAC rule 3745-31-05(C) and OAC rule 3745-17-07(A)(1). See T&C A.2.b.
Visible particulate emissions from any stack associated with emissions unit P041 shall not exceed 20 percent opacity, as a six-minute average, except as specified by rule.
The emission limitation specified by this rule is less stringent than the emission limitation established pursuant to OAC rule 3745-31-05(A)(3).

2. Additional Terms and Conditions

2.a The hourly emission limitations outlined in term A.1. are based upon the emissions unit's

potential to emit. Therefore, no hourly records are required to demonstrate compliance with these limits.

2.b The actual emissions of Hazardous Air Pollutants (HAPs), as identified in Section 112(b) of Title III of the Clean Air Act, from this facility shall not exceed 9.9 TPY for any single HAP and 24.9 TPY for any combination of HAPs. Compliance with the above limitations shall be based on a rolling, 12-month summation. The permittee has existing records to demonstrate compliance with these limits upon issuance of this permit.

2.c Compliance with OAC rule 3745-31-05(A)(3) shall be demonstrated by the use of a wet scrubber, compliance with the HCl emissions limits and compliance with the facility-wide HAPs emissions limits.

B. Operational Restrictions

1. The scrubber water recirculation flow rate shall be continuously maintained at a value of not less than 10 gallons per minute at all times while the emissions unit is in operation.

2. The scrubber water make-up flow rate shall be continuously maintained at a value of not less than 1 gallon per minute at all times while the emissions unit is in operation.

C. Monitoring and/or Recordkeeping Requirements

1. The permittee shall properly install, operate and maintain equipment to continuously monitor the scrubber water recirculation flow rate and the scrubber water make-up flow rate into the scrubber while the emissions unit is in operation. The monitoring devices and any recorders shall be installed, calibrated, operated and maintained in accordance with the manufacturer's recommendations, instructions and operating manuals.

   The permittee shall collect and record the following information each day:

   a. the scrubber water recirculation flow rate, in gallons per minute, on a once per day basis;

   b. the scrubber water make-up flow rate, in gallons per minute, on a once per day basis; and

   c. the operating times for the capture (collection) system, control device, monitoring equipment, and the associated emissions unit.

2. The permittee shall collect and record the following information each month for the entire facility:

   a. for all epitaxial reactors, the amount of hydrogen chloride (HCl) used (input), in pounds;

b. for all epitaxial reactors, the amount of HCl released from the reaction of trichlorosilane, in pounds;

c. for all epitaxial reactors, the amount of controlled emissions of each HAP, in tons;

d. for all emissions units, the amount of any other material used which contains HAPs, in tons;

e. for all emissions units, the individual HAP content for each HAP of each material used, in percent by weight (ton HAP/ton material);

f. the total individual HAP emissions for each HAP from all materials employed, in tons per month [for each HAP the sum of c. plus (d. times e.)];

g. the total combined HAP emissions from all materials employed, in tons per month (the sum of all HAPs as calculated in f.);

h. the updated rolling, 12-month summation of each individual HAP emissions, in pounds or tons. This shall include the information for the current month and the preceding eleven calender months ; and

i. the updated rolling, 12-month summation of total combined HAP emissions, in pounds or tons. This shall include the information for the current month and the preceding eleven calender months.

* A listing of the HAPs can be found in Section 112(b) of the Clean Air Act or can be obtained by contacting your Hamilton County Department of Environmental Services contact. This information does not have to be kept on a individual emissions unit basis.

3. The permit to install for emissions units P036 - P050 was evaluated based on the actual materials and the design parameters of the emissions unit's exhaust systems, as specified by the permittee in the permit to install application. The Ohio EPA's "Review of New Sources of Air Toxic Emissions" policy ("Air Toxic Policy") was applied for each pollutant emitted by this emissions unit using data from the permit to install application and the SCREEN 3.0 model (or other Ohio EPA approved model). The predicted 1-hour maximum ground-level concentration from the use of the SCREEN 3.0 model was compared to the Maximum Ground-Level Concentration (MAGLC).

The following summarizes the results of the modeling for the "worst case" pollutant(s):

Pollutant: HCl (CAS 7647-01-0)

TLV (ug/m^3): 2198

Maximum Hourly Emission Rate (lbs/hr): 0.105 lbs/hr HCl, P036 - P050, combined

Predicted 1-Hour Maximum Ground-Level Concentration (ug/m^3): 16.82 Ug/m^3, P036 - P050, combined

MAGLC (ug/m^3): 52.33

Physical changes to or in the method of operation of the emissions unit after it's installation or modification could affect the parameters used to determine whether or not the "Air Toxics Policy" is satisfied. Consequently, prior to making a change that could impact such parameters, the permittee shall conduct an evaluation to determine that the "Air Toxic Policy" will still be satisfied. If, upon evaluation, the permittee determines that the "Air Toxic Policy" will not be satisfied, the permittee will not make the change. Changes that can affect the parameters used in the "Air Toxic Policy" include the following:

a. changes in the composition of the materials used (typically for coatings or cleanup materials), or the use of new materials, that would result in the emission of a compound with a lower Threshold Limit Value (TLV), as indicated in the most recent version of the handbook entitled "American Conference of Governmental Industrial Hygienists (ACGIH)," than the lowest TLV value previously modeled;

b. changes in the composition of the materials, or use of new materials, that would result in an increase in emissions of any pollutant with a listed TLV that was proposed in the application and modeled; and

c. physical changes to the emissions unit or its exhaust parameters (e.g., increased/decreased exhaust flow, changes in stack height, changes in stack diameter, etc.).

If the permittee determines that the "Air Toxic Policy" will be satisfied for the above changes, the Ohio EPA will not consider the change(s) to be a "modification" under OAC rule 3745-31-01 solely due to the emissions of any type of toxic air contaminant not previously emitted, and a modification of the existing permit to install will not be required, even if the toxic air contaminant emissions are greater than the de minimis level in OAC rule 3745-15-05. If the change(s) is (are) defined as a modification under other provisions of the modification definition, then the permittee shall obtain a final permit to install prior to the change.

The permittee shall collect, record, and retain the following information when it conducts evaluations to determine that the changed emissions unit will satisfy the Air Toxic Policy:"

a. a description of the parameters changed(composition of materials, new pollutants emitted, change in stack/exhaust parameters, etc.);

b. documentation of it's evaluation and determination that the changed emissions unit still satisfies the "Air Toxic Policy"; and

c. when the computer modeling is performed, a copy of the resulting computer model runs that show the results of the application of the "Air Toxic Policy" for the change.

D. Reporting Requirements

1. The permittee shall submit quarterly deviation (excursion) reports to the Hamilton County Department of Environmental Services that identify all periods of time during which the following scrubber parameters were not maintained at or above the required levels:

   a. the scrubber water recirculation flow rate; and

   b. the scrubber water make-up flow rate.

   If no exceedances occurred during the reporting period then a report is required stating so. These reports shall be submitted by January 31, April 30, July 31, and October 31 of each year and shall cover the previous calendar quarters.

2. The permittee shall notify the Hamilton County Department of Environmental Services of any exceedance of the HAP emissions limitations set forth in term A.2.b. The reports shall be submitted to the Director (the Hamilton County Department of Environmental Services) by January 31, April 30, July 31 and October 31 of each year and shall cover the previous three calendar months (October through December, January through March, April through June and July through September, respectively.)

   If no exceedances occurred, the permittee shall state so in the report.

E. Testing Requirements

1. Emissions Limitations

   The hydrochloric acid (HCl) emissions shall not exceed 0.007 pound per hour (lb/hr)
   The hydrochloric acid (HCl) emissions shall not exceed 0.032 Tons per Year (TPY)

   Applicable Compliance Methods

Compliance with the hourly HCl emissions limitation shall be determined by the following calculations:

a. for the conversion of TCS to HCl in the scrubber:

actual trichlorosilane usage (lbs TCS/hr) x unit conversion trichlorosilane (1 mole TCS/135.4524 gMW TCS) x stoichiometric ratio (3 moles HCl/1 mole TCS) x unit conversion HCl (36.3609 gMW HCL/1 mole HCl) = lbs HCl/hr

b. for the addition of HCl in the hi-etch process:

actual cycle time (min/cycle) x actual production rate (cycles/hr) x actual flow rate (liters HCl/hr) x conversion factor (ft3/28.3168 liters) x conversion factor (1 lb HCl/9.7752 ft3 HCl) = lbs HCl/hr; and

c. (lbs HCl/hr from the conversion of TCS + lbs HCl/hr from the addition of HCl) x scrubber efficiency (1 - 99.5/100) = lbs HCl/hr from the scrubber stack

Compliance with the annual HCl emissions limitation shall be determined by the recordkeeping requirement in T&C C.2.h.

2. Emissions Limitation

Visible particulate emissions from any stack associated with emissions unit P041 shall not exceed 20 percent opacity, as a six-minute average, except as specified by rule

Applicable Compliance Method

Compliance shall be determined in accordance with Test Method 9 as set forth in "Appendix on Test Methods" in 40 CFR, Part 60 ("Standards of Performance for New Stationary Sources"), as such Appendix existed on July 1, 1996.

3. Emissions Limitations

9.9 TPY for any single HAP and 24.9 TPY for any combination of HAPs

Compliance with the HAPs emissions limits outlined in T&C A.2.b. shall be demonstrated by the recordkeeping requirements in T&C C.2.

4. Compliance with the operational restrictions for the wet scrubber in T&Cs B.1. and B.2. shall be demonstrated by the recordkeeping requirements in T&C C.1.

Emissions Unit ID: **P041**

F. Miscellaneous Requirements

1. The following terms and conditions of this permit are federally enforceable: A, B, C.1, C.2, D and E.

PART II - SPECIAL TERMS AND CONDITIONS FOR SPECIFIC EMISSIONS UNIT(S)

A. Applicable Emissions Limitations and/or Control Requirements

1. The specific operations(s), property, and/or equipment which constitute this emissions unit are listed in the following table along with the applicable rules and/or requirements and with the applicable emissions limitations and/or control measures. Emissions from this unit shall not exceed the listed limitations, and the listed control measures shall be specified in narrative form following the table.

Operations, Property, and/or Equipment	Applicable Rules/Requirements	OAC rule 3745-17-11(B)
P042 - A07 - ASM Single Wafer Reactor; S07 - OTE Fume Scrubber	OAC rule 3745-31-05(A)(3)	
	OAC rule 3745-31-05(C) (to avoid being subject to OAC rules 3745-31-28 and Title V permitting requirements)	
	OAC rule 3745-17-07(A)(1)	

Applicable Emissions Limitations/Control Measures
The hydrochloric acid (HCl) emissions shall not exceed 0.007 pound per hour (lb/hr).
The hydrochloric acid (HCl) emissions shall not exceed 0.032 Tons per Year (TPY). See T&C A.2.c.
The requirements of this rule also include compliance with the requirements of OAC rule 3745-31-05(C) and OAC rule 3745-17-07(A)(1). See T&C A.2.b.
Visible particulate emissions from any stack associated with emissions unit P042 shall not exceed 20 percent opacity, as a six-minute average, except as specified by rule.
The emission limitation specified by this rule is less stringent than the emission limitation established pursuant to OAC rule 3745-31-05(A)(3).

2. Additional Terms and Conditions

2.a The hourly emission limitations outlined in term A.1. are based upon the emissions unit's

potential to emit. Therefore, no hourly records are required to demonstrate compliance with these limits.

2.b The actual emissions of Hazardous Air Pollutants (HAPs), as identified in Section 112(b) of Title III of the Clean Air Act, from this facility shall not exceed 9.9 TPY for any single HAP and 24.9 TPY for any combination of HAPs. Compliance with the above limitations shall be based on a rolling, 12-month summation. The permittee has existing records to demonstrate compliance with these limits upon issuance of this permit.

2.c Compliance with OAC rule 3745-31-05(A)(3) shall be demonstrated by the use of a wet scrubber, compliance with the HCl emissions limits and compliance with the facility-wide HAPs emissions limits.

B. Operational Restrictions

1. The scrubber water recirculation flow rate shall be continuously maintained at a value of not less than 10 gallons per minute at all times while the emissions unit is in operation.

2. The scrubber water make-up flow rate shall be continuously maintained at a value of not less than 1 gallon per minute at all times while the emissions unit is in operation.

C. Monitoring and/or Recordkeeping Requirements

1. The permittee shall properly install, operate and maintain equipment to continuously monitor the scrubber water recirculation flow rate and the scrubber water make-up flow rate into the scrubber while the emissions unit is in operation. The monitoring devices and any recorders shall be installed, calibrated, operated and maintained in accordance with the manufacturer's recommendations, instructions and operating manuals.

   The permittee shall collect and record the following information each day:

   a. the scrubber water recirculation flow rate, in gallons per minute, on a once per day basis;

   b. the scrubber water make-up flow rate, in gallons per minute, on a once per day basis; and

   c. the operating times for the capture (collection) system, control device, monitoring equipment, and the associated emissions unit.

2. The permittee shall collect and record the following information each month for the entire facility:

   a. for all epitaxial reactors, the amount of hydrogen chloride (HCl) used (input), in pounds;

b. for all epitaxial reactors, the amount of HCl released from the reaction of trichlorosilane, in pounds;

c. for all epitaxial reactors, the amount of controlled emissions of each HAP, in tons;

d. for all emissions units, the amount of any other material used which contains HAPs, in tons;

e. for all emissions units, the individual HAP content for each HAP of each material used, in percent by weight (ton HAP/ton material);

f. the total individual HAP emissions for each HAP from all materials employed, in tons per month [for each HAP the sum of c. plus (d. times e.)];

g. the total combined HAP emissions from all materials employed, in tons per month (the sum of all HAPs as calculated in f.);

h. the updated rolling, 12-month summation of each individual HAP emissions, in pounds or tons. This shall include the information for the current month and the preceding eleven calender months ; and

i. the updated rolling, 12-month summation of total combined HAP emissions, in pounds or tons. This shall include the information for the current month and the preceding eleven calender months.

* A listing of the HAPs can be found in Section 112(b) of the Clean Air Act or can be obtained by contacting your Hamilton County Department of Environmental Services contact. This information does not have to be kept on a individual emissions unit basis.

3. The permit to install for emissions units P036 - P050 was evaluated based on the actual materials and the design parameters of the emissions unit's exhaust systems, as specified by the permittee in the permit to install application. The Ohio EPA's "Review of New Sources of Air Toxic Emissions" policy ("Air Toxic Policy") was applied for each pollutant emitted by this emissions unit using data from the permit to install application and the SCREEN 3.0 model (or other Ohio EPA approved model). The predicted 1-hour maximum ground-level concentration from the use of the SCREEN 3.0 model was compared to the Maximum Ground-Level Concentration (MAGLC).

The following summarizes the results of the modeling for the "worst case" pollutant(s):

Pollutant: HCl (CAS 7647-01-0)

TLV (ug/m^3): 2198

Maximum Hourly Emission Rate (lbs/hr): 0.105 lbs/hr HCl, P036 - P050, combined

Predicted 1-Hour Maximum Ground-Level Concentration (ug/m^3): 16.82 Ug/m^3, P036 - P050, combined

MAGLC (ug/m^3): 52.33

Physical changes to or in the method of operation of the emissions unit after it's installation or modification could affect the parameters used to determine whether or not the "Air Toxics Policy" is satisfied. Consequently, prior to making a change that could impact such parameters, the permittee shall conduct an evaluation to determine that the "Air Toxic Policy" will still be satisfied. If, upon evaluation, the permittee determines that the "Air Toxic Policy" will not be satisfied, the permittee will not make the change. Changes that can affect the parameters used in the "Air Toxic Policy" include the following:

a. changes in the composition of the materials used (typically for coatings or cleanup materials), or the use of new materials, that would result in the emission of a compound with a lower Threshold Limit Value (TLV), as indicated in the most recent version of the handbook entitled "American Conference of Governmental Industrial Hygienists (ACGIH)," than the lowest TLV value previously modeled;

b. changes in the composition of the materials, or use of new materials, that would result in an increase in emissions of any pollutant with a listed TLV that was proposed in the application and modeled; and

c. physical changes to the emissions unit or its exhaust parameters (e.g., increased/decreased exhaust flow, changes in stack height, changes in stack diameter, etc.).

If the permittee determines that the "Air Toxic Policy" will be satisfied for the above changes, the Ohio EPA will not consider the change(s) to be a "modification" under OAC rule 3745-31-01 solely due to the emissions of any type of toxic air contaminant not previously emitted, and a modification of the existing permit to install will not be required, even if the toxic air contaminant emissions are greater than the de minimis level in OAC rule 3745-15-05. If the change(s) is (are) defined as a modification under other provisions of the modification definition, then the permittee shall obtain a final permit to install prior to the change.

The permittee shall collect, record, and retain the following information when it conducts evaluations to determine that the changed emissions unit will satisfy the Air Toxic Policy:"

a. a description of the parameters changed(composition of materials, new pollutants emitted, change in stack/exhaust parameters, etc.);

b. documentation of it's evaluation and determination that the changed emissions unit still satisfies the "Air Toxic Policy"; and

c. when the computer modeling is performed, a copy of the resulting computer model runs that show the results of the application of the "Air Toxic Policy" for the change.

D. Reporting Requirements

1. The permittee shall submit quarterly deviation (excursion) reports to the Hamilton County Department of Environmental Services that identify all periods of time during which the following scrubber parameters were not maintained at or above the required levels:

   a. the scrubber water recirculation flow rate; and

   b. the scrubber water make-up flow rate.

   If no exceedances occurred during the reporting period then a report is required stating so. These reports shall be submitted by January 31, April 30, July 31, and October 31 of each year and shall cover the previous calendar quarters.

2. The permittee shall notify the Hamilton County Department of Environmental Services of any exceedance of the HAP emissions limitations set forth in term A.2.b. The reports shall be submitted to the Director (the Hamilton County Department of Environmental Services) by January 31, April 30, July 31 and October 31 of each year and shall cover the previous three calendar months (October through December, January through March, April through June and July through September, respectively.)

   If no exceedances occurred, the permittee shall state so in the report.

E. Testing Requirements

1. Emissions Limitations

   The hydrochloric acid (HCl) emissions shall not exceed 0.007 pound per hour (lb/hr)
   The hydrochloric acid (HCl) emissions shall not exceed 0.032 Tons per Year (TPY)

   Applicable Compliance Methods

Compliance with the hourly HCl emissions limitation shall be determined by the following calculations:

a. for the conversion of TCS to HCl in the scrubber:

actual trichlorosilane usage (lbs TCS/hr) x unit conversion trichlorosilane (1 mole TCS/135.4524 gMW TCS) x stoichiometric ratio (3 moles HCl/1 mole TCS) x unit conversion HCl (36.3609 gMW HCL/1 mole HCl) = lbs HCl/hr

b. for the addition of HCl in the hi-etch process:

actual cycle time (min/cycle) x actual production rate (cycles/hr) x actual flow rate (liters HCl/hr) x conversion factor (ft3/28.3168 liters) x conversion factor (1 lb HCl/9.7752 ft3 HCl) = lbs HCl/hr; and

c. (lbs HCl/hr from the conversion of TCS + lbs HCl/hr from the addition of HCl) x scrubber efficiency (1 - 99.5/100) = lbs HCl/hr from the scrubber stack

Compliance with the annual HCl emissions limitation shall be determined by the recordkeeping requirement in T&C C.2.h.

2. Emissions Limitation

Visible particulate emissions from any stack associated with emissions unit P042 shall not exceed 20 percent opacity, as a six-minute average, except as specified by rule

Applicable Compliance Method

Compliance shall be determined in accordance with Test Method 9 as set forth in "Appendix on Test Methods" in 40 CFR, Part 60 ("Standards of Performance for New Stationary Sources"), as such Appendix existed on July 1, 1996.

3. Emissions Limitations

9.9 TPY for any single HAP and 24.9 TPY for any combination of HAPs

Compliance with the HAPs emissions limits outlined in T&C A.2.b. shall be demonstrated by the recordkeeping requirements in T&C C.2.

4. Compliance with the operational restrictions for the wet scrubber in T&Cs B.1. and B.2. shall be demonstrated by the recordkeeping requirements in T&C C.1.

F. Miscellaneous Requirements

1. The following terms and conditions of this permit are federally enforceable: A, B, C.1, C.2, D and E.

PART II - SPECIAL TERMS AND CONDITIONS FOR SPECIFIC EMISSIONS UNIT(S)

A. Applicable Emissions Limitations and/or Control Requirements

1. The specific operations(s), property, and/or equipment which constitute this emissions unit are listed in the following table along with the applicable rules and/or requirements and with the applicable emissions limitations and/or control measures. Emissions from this unit shall not exceed the listed limitations, and the listed control measures shall be specified in narrative form following the table.

Operations, Property, and/or Equipment	Applicable Rules/Requirements	OAC rule 3745-17-11(B)
P043 - A08 - ASM Single Wafer Reactor; S08 - OTE Fume Scrubber	OAC rule 3745-31-05(A)(3)	
	OAC rule 3745-31-05(C) (to avoid being subject to OAC rules 3745-31-28 and Title V permitting requirements)	
	OAC rule 3745-17-07(A)(1)	

Applicable Emissions Limitations/Control Measures
The hydrochloric acid (HCl) emissions shall not exceed 0.007 pound per hour (lb/hr).
The hydrochloric acid (HCl) emissions shall not exceed 0.032 Tons per Year (TPY). See T&C A.2.c.
The requirements of this rule also include compliance with the requirements of OAC rule 3745-31-05(C) and OAC rule 3745-17-07(A)(1). See T&C A.2.b.
Visible particulate emissions from any stack associated with emissions unit P043 shall not exceed 20 percent opacity, as a six-minute average, except as specified by rule.
The emission limitation specified by this rule is less stringent than the emission limitation established pursuant to OAC rule 3745-31-05(A)(3).

2. Additional Terms and Conditions

2.a The hourly emission limitations outlined in term A.1. are based upon the emissions unit's

potential to emit. Therefore, no hourly records are required to demonstrate compliance with these limits.

2.b The actual emissions of Hazardous Air Pollutants (HAPs), as identified in Section 112(b) of Title III of the Clean Air Act, from this facility shall not exceed 9.9 TPY for any single HAP and 24.9 TPY for any combination of HAPs. Compliance with the above limitations shall be based on a rolling, 12-month summation. The permittee has existing records to demonstrate compliance with these limits upon issuance of this permit.

2.c Compliance with OAC rule 3745-31-05(A)(3) shall be demonstrated by the use of a wet scrubber, compliance with the HCl emissions limits and compliance with the facility-wide HAPs emissions limits.

B. Operational Restrictions

1. The scrubber water recirculation flow rate shall be continuously maintained at a value of not less than 10 gallons per minute at all times while the emissions unit is in operation.

2. The scrubber water make-up flow rate shall be continuously maintained at a value of not less than 1 gallon per minute at all times while the emissions unit is in operation.

C. Monitoring and/or Recordkeeping Requirements

1. The permittee shall properly install, operate and maintain equipment to continuously monitor the scrubber water recirculation flow rate and the scrubber water make-up flow rate into the scrubber while the emissions unit is in operation. The monitoring devices and any recorders shall be installed, calibrated, operated and maintained in accordance with the manufacturer's recommendations, instructions and operating manuals.

   The permittee shall collect and record the following information each day:

   a. the scrubber water recirculation flow rate, in gallons per minute, on a once per day basis;

   b. the scrubber water make-up flow rate, in gallons per minute, on a once per day basis; and

   c. the operating times for the capture (collection) system, control device, monitoring equipment, and the associated emissions unit.

2. The permittee shall collect and record the following information each month for the entire facility:

   a. for all epitaxial reactors, the amount of hydrogen chloride (HCl) used (input), in pounds;

b. for all epitaxial reactors, the amount of HCl released from the reaction of trichlorosilane, in pounds;

c. for all epitaxial reactors, the amount of controlled emissions of each HAP, in tons;

d. for all emissions units, the amount of any other material used which contains HAPs, in tons;

e. for all emissions units, the individual HAP content for each HAP of each material used, in percent by weight (ton HAP/ton material);

f. the total individual HAP emissions for each HAP from all materials employed, in tons per month [for each HAP the sum of c. plus (d. times e.)];

g. the total combined HAP emissions from all materials employed, in tons per month (the sum of all HAPs as calculated in f.);

h. the updated rolling, 12-month summation of each individual HAP emissions, in pounds or tons. This shall include the information for the current month and the preceding eleven calender months ; and

i. the updated rolling, 12-month summation of total combined HAP emissions, in pounds or tons. This shall include the information for the current month and the preceding eleven calender months.

* A listing of the HAPs can be found in Section 112(b) of the Clean Air Act or can be obtained by contacting your Hamilton County Department of Environmental Services contact. This information does not have to be kept on a individual emissions unit basis.

3. The permit to install for emissions units P036 - P050 was evaluated based on the actual materials and the design parameters of the emissions unit's exhaust systems, as specified by the permittee in the permit to install application. The Ohio EPA's "Review of New Sources of Air Toxic Emissions" policy ("Air Toxic Policy") was applied for each pollutant emitted by this emissions unit using data from the permit to install application and the SCREEN 3.0 model (or other Ohio EPA approved model). The predicted 1-hour maximum ground-level concentration from the use of the SCREEN 3.0 model was compared to the Maximum Ground-Level Concentration (MAGLC).

The following summarizes the results of the modeling for the "worst case" pollutant(s):

Pollutant: HCl (CAS 7647-01-0)

TLV (ug/m^3): 2198

Maximum Hourly Emission Rate (lbs/hr): 0.105 lbs/hr HCl, P036 - P050, combined

Predicted 1-Hour Maximum Ground-Level Concentration (ug/m^3): 16.82 Ug/m^3, P036 - P050, combined

MAGLC (ug/m^3): 52.33

Physical changes to or in the method of operation of the emissions unit after it's installation or modification could affect the parameters used to determine whether or not the "Air Toxics Policy" is satisfied. Consequently, prior to making a change that could impact such parameters, the permittee shall conduct an evaluation to determine that the "Air Toxic Policy" will still be satisfied. If, upon evaluation, the permittee determines that the "Air Toxic Policy" will not be satisfied, the permittee will not make the change. Changes that can affect the parameters used in the "Air Toxic Policy" include the following:

a. changes in the composition of the materials used (typically for coatings or cleanup materials), or the use of new materials, that would result in the emission of a compound with a lower Threshold Limit Value (TLV), as indicated in the most recent version of the handbook entitled "American Conference of Governmental Industrial Hygienists (ACGIH)," than the lowest TLV value previously modeled;

b. changes in the composition of the materials, or use of new materials, that would result in an increase in emissions of any pollutant with a listed TLV that was proposed in the application and modeled; and

c. physical changes to the emissions unit or its exhaust parameters (e.g., increased/decreased exhaust flow, changes in stack height, changes in stack diameter, etc.).

If the permittee determines that the "Air Toxic Policy" will be satisfied for the above changes, the Ohio EPA will not consider the change(s) to be a "modification" under OAC rule 3745-31-01 solely due to the emissions of any type of toxic air contaminant not previously emitted, and a modification of the existing permit to install will not be required, even if the toxic air contaminant emissions are greater than the de minimis level in OAC rule 3745-15-05. If the change(s) is (are) defined as a modification under other provisions of the modification definition, then the permittee

shall obtain a final permit to install prior to the change.

The permittee shall collect, record, and retain the following information when it conducts evaluations to determine that the changed emissions unit will satisfy the Air Toxic Policy:"

a. a description of the parameters changed(composition of materials, new pollutants emitted, change in stack/exhaust parameters, etc.);

b. documentation of it's evaluation and determination that the changed emissions unit still satisfies the "Air Toxic Policy"; and

c. when the computer modeling is performed, a copy of the resulting computer model runs that show the results of the application of the "Air Toxic Policy" for the change.

D. Reporting Requirements

1. The permittee shall submit quarterly deviation (excursion) reports to the Hamilton County Department of Environmental Services that identify all periods of time during which the following scrubber parameters were not maintained at or above the required levels:

   a. the scrubber water recirculation flow rate; and

   b. the scrubber water make-up flow rate.

   If no exceedances occurred during the reporting period then a report is required stating so. These reports shall be submitted by January 31, April 30, July 31, and October 31 of each year and shall cover the previous calendar quarters.

2. The permittee shall notify the Hamilton County Department of Environmental Services of any exceedance of the HAP emissions limitations set forth in term A.2.b. The reports shall be submitted to the Director (the Hamilton County Department of Environmental Services) by January 31, April 30, July 31 and October 31 of each year and shall cover the previous three calendar months (October through December, January through March, April through June and July through September, respectively.)

   If no exceedances occurred, the permittee shall state so in the report.

E. Testing Requirements

1. Emissions Limitations

   The hydrochloric acid (HCl) emissions shall not exceed 0.007 pound per hour (lb/hr)

The hydrochloric acid (HCl) emissions shall not exceed 0.032 Tons per Year (TPY)

Applicable Compliance Methods

Compliance with the hourly HCl emissions limitation shall be determined by the following calculations:

a. for the conversion of TCS to HCl in the scrubber:

actual trichlorosilane usage (lbs TCS/hr) x unit conversion trichlorosilane (1 mole TCS/135.4524 gMW TCS) x stoichiometric ratio (3 moles HCl/1 mole TCS) x unit conversion HCl (36.3609 gMW HCL/1 mole HCl) = lbs HCl/hr

b. for the addition of HCl in the hi-etch process:

actual cycle time (min/cycle) x actual production rate (cycles/hr) x actual flow rate (liters HCl/hr) x conversion factor (ft3/28.3168 liters) x conversion factor (1 lb HCl/9.7752 ft3 HCl) = lbs HCl/hr; and

c. (lbs HCl/hr from the conversion of TCS + lbs HCl/hr from the addition of HCl) x scrubber efficiency (1 - 99.5/100) = lbs HCl/hr from the scrubber stack

Compliance with the annual HCl emissions limitation shall be determined by the recordkeeping requirement in T&C C.2.h.

2. Emissions Limitation

Visible particulate emissions from any stack associated with emissions unit P043 shall not exceed 20 percent opacity, as a six-minute average, except as specified by rule

Applicable Compliance Method

Compliance shall be determined in accordance with Test Method 9 as set forth in "Appendix on Test Methods" in 40 CFR, Part 60 ("Standards of Performance for New Stationary Sources"), as such Appendix existed on July 1, 1996.

3. Emissions Limitations

9.9 TPY for any single HAP and 24.9 TPY for any combination of HAPs

Compliance with the HAPs emissions limits outlined in T&C A.2.b. shall be demonstrated by the recordkeeping requirements in T&C C.2.

4. Compliance with the operational restrictions for the wet scrubber in T&Cs B.1. and B.2. shall be demonstrated by the recordkeeping requirements in T&C C.1.

F. Miscellaneous Requirements

1. The following terms and conditions of this permit are federally enforceable: A, B, C.1, C.2, D and E.

PART II - SPECIAL TERMS AND CONDITIONS FOR SPECIFIC EMISSIONS UNIT(S)

A. Applicable Emissions Limitations and/or Control Requirements

1. The specific operations(s), property, and/or equipment which constitute this emissions unit are listed in the following table along with the applicable rules and/or requirements and with the applicable emissions limitations and/or control measures. Emissions from this unit shall not exceed the listed limitations, and the listed control measures shall be specified in narrative form following the table.

Operations, Property, and/or Equipment	Applicable Rules/Requirements	
P044 - A09 - ASM Single Wafer Reactor; S09 - OTE Fume Scrubber	OAC rule 3745-31-05(A)(3)	OAC rule 3745-17-11(B)
	OAC rule 3745-31-05(C) (to avoid being subject to OAC rules 3745-31-28 and Title V permitting requirements)	
	OAC rule 3745-17-07(A)(1)	

Applicable Emissions Limitations/Control Measures	
The hydrochloric acid (HCl) emissions shall not exceed 0.007 pound per hour (lb/hr).	
The hydrochloric acid (HCl) emissions shall not exceed 0.032 Tons per Year (TPY).	See T&C A.2.c.
The requirements of this rule also include compliance with the requirements of OAC rule 3745-31-05(C) and OAC rule 3745-17-07(A)(1).	See T&C A.2.b.
Visible particulate emissions from any stack associated with emissions unit P044 shall not exceed 20 percent opacity, as a six-minute average, except as specified by rule.	
The emission limitation specified by this rule is less stringent than the emission limitation established pursuant to OAC rule 3745-31-05(A)(3).	

2. Additional Terms and Conditions

2.a The hourly emission limitations outlined in term A.1. are based upon the emissions unit's potential to emit. Therefore, no hourly records are required to demonstrate compliance with these limits.

2.b The actual emissions of Hazardous Air Pollutants (HAPs), as identified in Section 112(b) of Title III of the Clean Air Act, from this facility shall not exceed 9.9 TPY for any single HAP and 24.9 TPY for any combination of HAPs. Compliance with the above limitations shall be based on a rolling, 12-month summation. The permittee has existing records to demonstrate compliance with these limits upon issuance of this permit.

2.c Compliance with OAC rule 3745-31-05(A)(3) shall be demonstrated by the use of a wet scrubber, compliance with the HCl emissions limits and compliance with the facility-wide HAPs emissions limits.

B. Operational Restrictions

1. The scrubber water recirculation flow rate shall be continuously maintained at a value of not less than 10 gallons per minute at all times while the emissions unit is in operation.

2. The scrubber water make-up flow rate shall be continuously maintained at a value of not less than 1 gallon per minute at all times while the emissions unit is in operation.

C. Monitoring and/or Recordkeeping Requirements

1. The permittee shall properly install, operate and maintain equipment to continuously monitor the scrubber water recirculation flow rate and the scrubber water make-up flow rate into the scrubber while the emissions unit is in operation. The monitoring devices and any recorders shall be installed, calibrated, operated and maintained in accordance with the manufacturer's recommendations, instructions and operating manuals.

   The permittee shall collect and record the following information each day:

   a. the scrubber water recirculation flow rate, in gallons per minute, on a once per day basis;

   b. the scrubber water make-up flow rate, in gallons per minute, on a once per day basis; and

   c. the operating times for the capture (collection) system, control device, monitoring equipment, and the associated emissions unit.

2. The permittee shall collect and record the following information each month for the entire facility:

a. for all epitaxial reactors, the amount of hydrogen chloride (HCl) used (input), in pounds;

b. for all epitaxial reactors, the amount of HCl released from the reaction of trichlorosilane, in pounds;

c. for all epitaxial reactors, the amount of controlled emissions of each HAP, in tons;

d. for all emissions units, the amount of any other material used which contains HAPs, in tons;

e. for all emissions units, the individual HAP content for each HAP of each material used, in percent by weight (ton HAP/ton material);

f. the total individual HAP emissions for each HAP from all materials employed, in tons per month [for each HAP the sum of c. plus (d. times e.)];

g. the total combined HAP emissions from all materials employed, in tons per month (the sum of all HAPs as calculated in f.);

h. the updated rolling, 12-month summation of each individual HAP emissions, in pounds or tons. This shall include the information for the current month and the preceding eleven calender months ; and

i. the updated rolling, 12-month summation of total combined HAP emissions, in pounds or tons. This shall include the information for the current month and the preceding eleven calender months.

* A listing of the HAPs can be found in Section 112(b) of the Clean Air Act or can be obtained by contacting your Hamilton County Department of Environmental Services contact. This information does not have to be kept on a individual emissions unit basis.

3. The permit to install for emissions units P036 - P050 was evaluated based on the actual materials and the design parameters of the emissions unit's exhaust systems, as specified by the permittee in the permit to install application. The Ohio EPA's "Review of New Sources of Air Toxic Emissions" policy ("Air Toxic Policy") was applied for each pollutant emitted by this emissions unit using data from the permit to install application and the SCREEN 3.0 model (or other Ohio EPA approved model). The predicted 1-hour maximum ground-level concentration from the use of the SCREEN 3.0 model was compared to the Maximum Ground-Level Concentration (MAGLC).

The following summarizes the results of the modeling for the "worst case" pollutant(s):

Pollutant: HCl (CAS 7647-01-0)

TLV (ug/m^3): 2198

Maximum Hourly Emission Rate (lbs/hr): 0.105 lbs/hr HCl, P036 - P050, combined

Predicted 1-Hour Maximum Ground-Level Concentration (ug/m^3): 16.82 Ug/m^3, P036 - P050, combined

MAGLC (ug/m^3): 52.33

Physical changes to or in the method of operation of the emissions unit after it's installation or modification could affect the parameters used to determine whether or not the "Air Toxics Policy" is satisfied. Consequently, prior to making a change that could impact such parameters, the permittee shall conduct an evaluation to determine that the "Air Toxic Policy" will still be satisfied. If, upon evaluation, the permittee determines that the "Air Toxic Policy" will not be satisfied, the permittee will not make the change. Changes that can affect the parameters used in the "Air Toxic Policy" include the following:

a. changes in the composition of the materials used (typically for coatings or cleanup materials), or the use of new materials, that would result in the emission of a compound with a lower Threshold Limit Value (TLV), as indicated in the most recent version of the handbook entitled "American Conference of Governmental Industrial Hygienists (ACGIH)," than the lowest TLV value previously modeled;

b. changes in the composition of the materials, or use of new materials, that would result in an increase in emissions of any pollutant with a listed TLV that was proposed in the application and modeled; and

c. physical changes to the emissions unit or its exhaust parameters (e.g., increased/decreased exhaust flow, changes in stack height, changes in stack diameter, etc.).

If the permittee determines that the "Air Toxic Policy" will be satisfied for the above changes, the Ohio EPA will not consider the change(s) to be a "modification" under OAC rule 3745-31-01 solely due to the emissions of any type of toxic air contaminant not previously emitted, and a modification of the existing permit to install will not be required, even if the toxic air contaminant emissions are greater than the de minimis level in OAC rule 3745-15-05. If the change(s) is (are) defined as a modification under other provisions of the modification definition, then the permittee

shall obtain a final permit to install prior to the change.

The permittee shall collect, record, and retain the following information when it conducts evaluations to determine that the changed emissions unit will satisfy the Air Toxic Policy:"

a. a description of the parameters changed(composition of materials, new pollutants emitted, change in stack/exhaust parameters, etc.);

b. documentation of it's evaluation and determination that the changed emissions unit still satisfies the "Air Toxic Policy"; and

c. when the computer modeling is performed, a copy of the resulting computer model runs that show the results of the application of the "Air Toxic Policy" for the change.

D. Reporting Requirements

1. The permittee shall submit quarterly deviation (excursion) reports to the Hamilton County Department of Environmental Services that identify all periods of time during which the following scrubber parameters were not maintained at or above the required levels:

   a. the scrubber water recirculation flow rate; and

   b. the scrubber water make-up flow rate.

   If no exceedances occurred during the reporting period then a report is required stating so. These reports shall be submitted by January 31, April 30, July 31, and October 31 of each year and shall cover the previous calendar quarters.

2. The permittee shall notify the Hamilton County Department of Environmental Services of any exceedance of the HAP emissions limitations set forth in term A.2.b. The reports shall be submitted to the Director (the Hamilton County Department of Environmental Services) by January 31, April 30, July 31 and October 31 of each year and shall cover the previous three calendar months (October through December, January through March, April through June and July through September, respectively.)

   If no exceedances occurred, the permittee shall state so in the report.

E. Testing Requirements

1. Emissions Limitations

   The hydrochloric acid (HCl) emissions shall not exceed 0.007 pound per hour (lb/hr)

The hydrochloric acid (HCl) emissions shall not exceed 0.032 Tons per Year (TPY)

Applicable Compliance Methods

Compliance with the hourly HCl emissions limitation shall be determined by the following calculations:

a. for the conversion of TCS to HCl in the scrubber:

actual trichlorosilane usage (lbs TCS/hr) x unit conversion trichlorosilane (1 mole TCS/135.4524 gMW TCS) x stoichiometric ratio (3 moles HCl/1 mole TCS) x unit conversion HCl (36.3609 gMW HCL/1 mole HCl) = lbs HCl/hr

b. for the addition of HCl in the hi-etch process:

actual cycle time (min/cycle) x actual production rate (cycles/hr) x actual flow rate (liters HCl/hr) x conversion factor (ft3/28.3168 liters) x conversion factor (1 lb HCl/9.7752 ft3 HCl) = lbs HCl/hr; and

c. (lbs HCl/hr from the conversion of TCS + lbs HCl/hr from the addition of HCl) x scrubber efficiency (1 - 99.5/100) = lbs HCl/hr from the scrubber stack

Compliance with the annual HCl emissions limitation shall be determined by the recordkeeping requirement in T&C C.2.h.

2. Emissions Limitation

Visible particulate emissions from any stack associated with emissions unit P044 shall not exceed 20 percent opacity, as a six-minute average, except as specified by rule

Applicable Compliance Method

Compliance shall be determined in accordance with Test Method 9 as set forth in "Appendix on Test Methods" in 40 CFR, Part 60 ("Standards of Performance for New Stationary Sources"), as such Appendix existed on July 1, 1996.

3. Emissions Limitations

9.9 TPY for any single HAP and 24.9 TPY for any combination of HAPs

Compliance with the HAPs emissions limits outlined in T&C A.2.b. shall be demonstrated by the recordkeeping requirements in T&C C.2.

4. Compliance with the operational restrictions for the wet scrubber in T&Cs B.1. and B.2. shall be demonstrated by the recordkeeping requirements in T&C C.1.

F. Miscellaneous Requirements

1. The following terms and conditions of this permit are federally enforceable: A, B, C.1, C.2, D and E.

Emissions Unit ID: **P045**

PART II - SPECIAL TERMS AND CONDITIONS FOR SPECIFIC EMISSIONS UNIT(S)

A. Applicable Emissions Limitations and/or Control Requirements

1. The specific operations(s), property, and/or equipment which constitute this emissions unit are listed in the following table along with the applicable rules and/or requirements and with the applicable emissions limitations and/or control measures. Emissions from this unit shall not exceed the listed limitations, and the listed control measures shall be specified in narrative form following the table.

Operations, Property, and/or Equipment	Applicable Rules/Requirements	OAC rule 3745-17-11(B)
P045 - A10 - ASM Single Wafer Reactor; S10 - OTE Fume Scrubber	OAC rule 3745-31-05(A)(3)	
	OAC rule 3745-31-05(C) (to avoid being subject to OAC rules 3745-31-28 and Title V permitting requirements)	
	OAC rule 3745-17-07(A)(1)	

Applicable Emissions Limitations/Control Measures
The hydrochloric acid (HCl) emissions shall not exceed 0.007 pound per hour (lb/hr).
The hydrochloric acid (HCl) emissions shall not exceed 0.032 Tons per Year (TPY). See T&C A.2.c.
The requirements of this rule also include compliance with the requirements of OAC rule 3745-31-05(C) and OAC rule 3745-17-07(A)(1). See T&C A.2.b.
Visible particulate emissions from any stack associated with emissions unit P045 shall not exceed 20 percent opacity, as a six-minute average, except as specified by rule.
The emission limitation specified by this rule is less stringent than the emission limitation established pursuant to OAC rule 3745-31-05(A)(3).

2. Additional Terms and Conditions

2.a The hourly emission limitations outlined in term A.1. are based upon the emissions unit's

potential to emit. Therefore, no hourly records are required to demonstrate compliance with these limits.

2.b The actual emissions of Hazardous Air Pollutants (HAPs), as identified in Section 112(b) of Title III of the Clean Air Act, from this facility shall not exceed 9.9 TPY for any single HAP and 24.9 TPY for any combination of HAPs. Compliance with the above limitations shall be based on a rolling, 12-month summation. The permittee has existing records to demonstrate compliance with these limits upon issuance of this permit.

2.c Compliance with OAC rule 3745-31-05(A)(3) shall be demonstrated by the use of a wet scrubber, compliance with the HCl emissions limits and compliance with the facility-wide HAPs emissions limits.

B. Operational Restrictions

1. The scrubber water recirculation flow rate shall be continuously maintained at a value of not less than 10 gallons per minute at all times while the emissions unit is in operation.

2. The scrubber water make-up flow rate shall be continuously maintained at a value of not less than 1 gallon per minute at all times while the emissions unit is in operation.

C. Monitoring and/or Recordkeeping Requirements

1. The permittee shall properly install, operate and maintain equipment to continuously monitor the scrubber water recirculation flow rate and the scrubber water make-up flow rate into the scrubber while the emissions unit is in operation. The monitoring devices and any recorders shall be installed, calibrated, operated and maintained in accordance with the manufacturer's recommendations, instructions and operating manuals.

   The permittee shall collect and record the following information each day:

   a. the scrubber water recirculation flow rate, in gallons per minute, on a once per day basis;

   b. the scrubber water make-up flow rate, in gallons per minute, on a once per day basis; and

   c. the operating times for the capture (collection) system, control device, monitoring equipment, and the associated emissions unit.

2. The permittee shall collect and record the following information each month for the entire facility:

   a. for all epitaxial reactors, the amount of hydrogen chloride (HCl) used (input), in pounds;

b. for all epitaxial reactors, the amount of HCl released from the reaction of trichlorosilane, in pounds;

c. for all epitaxial reactors, the amount of controlled emissions of each HAP, in tons;

d. for all emissions units, the amount of any other material used which contains HAPs, in tons;

e. for all emissions units, the individual HAP content for each HAP of each material used, in percent by weight (ton HAP/ton material);

f. the total individual HAP emissions for each HAP from all materials employed, in tons per month [for each HAP the sum of c. plus (d. times e.)];

g. the total combined HAP emissions from all materials employed, in tons per month (the sum of all HAPs as calculated in f.);

h. the updated rolling, 12-month summation of each individual HAP emissions, in pounds or tons. This shall include the information for the current month and the preceding eleven calender months ; and

i. the updated rolling, 12-month summation of total combined HAP emissions, in pounds or tons. This shall include the information for the current month and the preceding eleven calender months.

* A listing of the HAPs can be found in Section 112(b) of the Clean Air Act or can be obtained by contacting your Hamilton County Department of Environmental Services contact. This information does not have to be kept on a individual emissions unit basis.

3. The permit to install for emissions units P036 - P050 was evaluated based on the actual materials and the design parameters of the emissions unit's exhaust systems, as specified by the permittee in the permit to install application. The Ohio EPA's "Review of New Sources of Air Toxic Emissions" policy ("Air Toxic Policy") was applied for each pollutant emitted by this emissions unit using data from the permit to install application and the SCREEN 3.0 model (or other Ohio EPA approved model). The predicted 1-hour maximum ground-level concentration from the use of the SCREEN 3.0 model was compared to the Maximum Ground-Level Concentration (MAGLC).

The following summarizes the results of the modeling for the "worst case" pollutant(s):

Pollutant: HCl (CAS 7647-01-0)

TLV (ug/m^3): 2198

Maximum Hourly Emission Rate (lbs/hr): 0.105 lbs/hr HCl, P036 - P050, combined

Predicted 1-Hour Maximum Ground-Level Concentration (ug/m^3): 16.82 Ug/m^3, P036 - P050, combined

MAGLC (ug/m^3): 52.33

Physical changes to or in the method of operation of the emissions unit after it's installation or modification could affect the parameters used to determine whether or not the "Air Toxics Policy" is satisfied. Consequently, prior to making a change that could impact such parameters, the permittee shall conduct an evaluation to determine that the "Air Toxic Policy" will still be satisfied. If, upon evaluation, the permittee determines that the "Air Toxic Policy" will not be satisfied, the permittee will not make the change. Changes that can affect the parameters used in the "Air Toxic Policy" include the following:

a. changes in the composition of the materials used (typically for coatings or cleanup materials), or the use of new materials, that would result in the emission of a compound with a lower Threshold Limit Value (TLV), as indicated in the most recent version of the handbook entitled "American Conference of Governmental Industrial Hygienists (ACGIH)," than the lowest TLV value previously modeled;

b. changes in the composition of the materials, or use of new materials, that would result in an increase in emissions of any pollutant with a listed TLV that was proposed in the application and modeled; and

c. physical changes to the emissions unit or its exhaust parameters (e.g., increased/decreased exhaust flow, changes in stack height, changes in stack diameter, etc.).

If the permittee determines that the "Air Toxic Policy" will be satisfied for the above changes, the Ohio EPA will not consider the change(s) to be a "modification" under OAC rule 3745-31-01 solely due to the emissions of any type of toxic air contaminant not previously emitted, and a modification of the existing permit to install will not be required, even if the toxic air contaminant emissions are greater than the de minimis level in OAC rule 3745-15-05. If the change(s) is (are) defined as a modification under other provisions of the modification definition, then the permittee shall obtain a final permit to install prior to the change.

The permittee shall collect, record, and retain the following information when it conducts evaluations to determine that the changed emissions unit will satisfy the Air Toxic Policy:"

a. a description of the parameters changed(composition of materials, new pollutants emitted, change in stack/exhaust parameters, etc.);

b. documentation of it's evaluation and determination that the changed emissions unit still satisfies the "Air Toxic Policy"; and

c. when the computer modeling is performed, a copy of the resulting computer model runs that show the results of the application of the "Air Toxic Policy" for the change.

D. Reporting Requirements

1. The permittee shall submit quarterly deviation (excursion) reports to the Hamilton County Department of Environmental Services that identify all periods of time during which the following scrubber parameters were not maintained at or above the required levels:

   a. the scrubber water recirculation flow rate; and

   b. the scrubber water make-up flow rate.

   If no exceedances occurred during the reporting period then a report is required stating so. These reports shall be submitted by January 31, April 30, July 31, and October 31 of each year and shall cover the previous calendar quarters.

2. The permittee shall notify the Hamilton County Department of Environmental Services of any exceedance of the HAP emissions limitations set forth in term A.2.b. The reports shall be submitted to the Director (the Hamilton County Department of Environmental Services) by January 31, April 30, July 31 and October 31 of each year and shall cover the previous three calendar months (October through December, January through March, April through June and July through September, respectively.)

   If no exceedances occurred, the permittee shall state so in the report.

E. Testing Requirements

1. Emissions Limitations

   The hydrochloric acid (HCl) emissions shall not exceed 0.007 pound per hour (lb/hr)
   The hydrochloric acid (HCl) emissions shall not exceed 0.032 Tons per Year (TPY)

   Applicable Compliance Methods

Compliance with the hourly HCl emissions limitation shall be determined by the following calculations:

a. for the conversion of TCS to HCl in the scrubber:

actual trichlorosilane usage (lbs TCS/hr) x unit conversion trichlorosilane (1 mole TCS/135.4524 gMW TCS) x stoichiometric ratio (3 moles HCl/1 mole TCS) x unit conversion HCl (36.3609 gMW HCL/1 mole HCl) = lbs HCl/hr

b. for the addition of HCl in the hi-etch process:

actual cycle time (min/cycle) x actual production rate (cycles/hr) x actual flow rate (liters HCl/hr) x conversion factor (ft3/28.3168 liters) x conversion factor (1 lb HCl/9.7752 ft3 HCl) = lbs HCl/hr; and

c. (lbs HCl/hr from the conversion of TCS + lbs HCl/hr from the addition of HCl) x scrubber efficiency (1 - 99.5/100) = lbs HCl/hr from the scrubber stack

Compliance with the annual HCl emissions limitation shall be determined by the recordkeeping requirement in T&C C.2.h.

2. Emissions Limitation

Visible particulate emissions from any stack associated with emissions unit P045 shall not exceed 20 percent opacity, as a six-minute average, except as specified by rule

Applicable Compliance Method

Compliance shall be determined in accordance with Test Method 9 as set forth in "Appendix on Test Methods" in 40 CFR, Part 60 ("Standards of Performance for New Stationary Sources"), as such Appendix existed on July 1, 1996.

3. Emissions Limitations

9.9 TPY for any single HAP and 24.9 TPY for any combination of HAPs

Compliance with the HAPs emissions limits outlined in T&C A.2.b. shall be demonstrated by the recordkeeping requirements in T&C C.2.

4. Compliance with the operational restrictions for the wet scrubber in T&Cs B.1. and B.2. shall be demonstrated by the recordkeeping requirements in T&C C.1.

F. Miscellaneous Requirements

1. The following terms and conditions of this permit are federally enforceable: A, B, C.1, C.2, D and E.

PART II - SPECIAL TERMS AND CONDITIONS FOR SPECIFIC EMISSIONS UNIT(S)

A. Applicable Emissions Limitations and/or Control Requirements

1. The specific operations(s), property, and/or equipment which constitute this emissions unit are listed in the following table along with the applicable rules and/or requirements and with the applicable emissions limitations and/or control measures. Emissions from this unit shall not exceed the listed limitations, and the listed control measures shall be specified in narrative form following the table.

Operations, Property, and/or Equipment	Applicable Rules/Requirements	OAC rule 3745-17-11(B)
P046 - A11 - ASM Single Wafer Reactor; S11 - OTE Fume Scrubber	OAC rule 3745-31-05(A)(3)	
	OAC rule 3745-31-05(C) (to avoid being subject to OAC rules 3745-31-28 and Title V permitting requirements)	
	OAC rule 3745-17-07(A)(1)	

Applicable Emissions Limitations/Control Measures	
The hydrochloric acid (HCl) emissions shall not exceed 0.007 pound per hour (lb/hr).	
The hydrochloric acid (HCl) emissions shall not exceed 0.032 Tons per Year (TPY).	See T&C A.2.c.
The requirements of this rule also include compliance with the requirements of OAC rule 3745-31-05(C) and OAC rule 3745-17-07(A)(1).	See T&C A.2.b.
Visible particulate emissions from any stack associated with emissions unit P046 shall not exceed 20 percent opacity, as a six-minute average, except as specified by rule.	
The emission limitation specified by this rule is less stringent than the emission limitation established pursuant to OAC rule 3745-31-05(A)(3).	

2. Additional Terms and Conditions

2.a The hourly emission limitations outlined in term A.1. are based upon the emissions unit's

potential to emit. Therefore, no hourly records are required to demonstrate compliance with these limits.

2.b The actual emissions of Hazardous Air Pollutants (HAPs), as identified in Section 112(b) of Title III of the Clean Air Act, from this facility shall not exceed 9.9 TPY for any single HAP and 24.9 TPY for any combination of HAPs. Compliance with the above limitations shall be based on a rolling, 12-month summation. The permittee has existing records to demonstrate compliance with these limits upon issuance of this permit.

2.c Compliance with OAC rule 3745-31-05(A)(3) shall be demonstrated by the use of a wet scrubber, compliance with the HCl emissions limits and compliance with the facility-wide HAPs emissions limits.

B. Operational Restrictions

1. The scrubber water recirculation flow rate shall be continuously maintained at a value of not less than 10 gallons per minute at all times while the emissions unit is in operation.

2. The scrubber water make-up flow rate shall be continuously maintained at a value of not less than 1 gallon per minute at all times while the emissions unit is in operation.

C. Monitoring and/or Recordkeeping Requirements

1. The permittee shall properly install, operate and maintain equipment to continuously monitor the scrubber water recirculation flow rate and the scrubber water make-up flow rate into the scrubber while the emissions unit is in operation. The monitoring devices and any recorders shall be installed, calibrated, operated and maintained in accordance with the manufacturer's recommendations, instructions and operating manuals.

   The permittee shall collect and record the following information each day:

   a. the scrubber water recirculation flow rate, in gallons per minute, on a once per day basis;

   b. the scrubber water make-up flow rate, in gallons per minute, on a once per day basis; and

   c. the operating times for the capture (collection) system, control device, monitoring equipment, and the associated emissions unit.

2. The permittee shall collect and record the following information each month for the entire facility:

   a. for all epitaxial reactors, the amount of hydrogen chloride (HCl) used (input), in pounds;

b. for all epitaxial reactors, the amount of HCl released from the reaction of trichlorosilane, in pounds;

c. for all epitaxial reactors, the amount of controlled emissions of each HAP, in tons;

d. for all emissions units, the amount of any other material used which contains HAPs, in tons;

e. for all emissions units, the individual HAP content for each HAP of each material used, in percent by weight (ton HAP/ton material);

f. the total individual HAP emissions for each HAP from all materials employed, in tons per month [for each HAP the sum of c. plus (d. times e.)];

g. the total combined HAP emissions from all materials employed, in tons per month (the sum of all HAPs as calculated in f.);

h. the updated rolling, 12-month summation of each individual HAP emissions, in pounds or tons. This shall include the information for the current month and the preceding eleven calender months ; and

i. the updated rolling, 12-month summation of total combined HAP emissions, in pounds or tons. This shall include the information for the current month and the preceding eleven calender months.

* A listing of the HAPs can be found in Section 112(b) of the Clean Air Act or can be obtained by contacting your Hamilton County Department of Environmental Services contact. This information does not have to be kept on a individual emissions unit basis.

3. The permit to install for emissions units P036 - P050 was evaluated based on the actual materials and the design parameters of the emissions unit's exhaust systems, as specified by the permittee in the permit to install application. The Ohio EPA's "Review of New Sources of Air Toxic Emissions" policy ("Air Toxic Policy") was applied for each pollutant emitted by this emissions unit using data from the permit to install application and the SCREEN 3.0 model (or other Ohio EPA approved model). The predicted 1-hour maximum ground-level concentration from the use of the SCREEN 3.0 model was compared to the Maximum Ground-Level Concentration (MAGLC).

The following summarizes the results of the modeling for the "worst case" pollutant(s):

Pollutant: HCl (CAS 7647-01-0)

TLV (ug/m^3): 2198

Maximum Hourly Emission Rate (lbs/hr): 0.105 lbs/hr HCl, P036 - P050, combined

Predicted 1-Hour Maximum Ground-Level Concentration (ug/m^3): 16.82 Ug/m^3, P036 - P050, combined

MAGLC (ug/m^3): 52.33

Physical changes to or in the method of operation of the emissions unit after it's installation or modification could affect the parameters used to determine whether or not the "Air Toxics Policy" is satisfied. Consequently, prior to making a change that could impact such parameters, the permittee shall conduct an evaluation to determine that the "Air Toxic Policy" will still be satisfied. If, upon evaluation, the permittee determines that the "Air Toxic Policy" will not be satisfied, the permittee will not make the change. Changes that can affect the parameters used in the "Air Toxic Policy" include the following:

a. changes in the composition of the materials used (typically for coatings or cleanup materials), or the use of new materials, that would result in the emission of a compound with a lower Threshold Limit Value (TLV), as indicated in the most recent version of the handbook entitled "American Conference of Governmental Industrial Hygienists (ACGIH)," than the lowest TLV value previously modeled;

b. changes in the composition of the materials, or use of new materials, that would result in an increase in emissions of any pollutant with a listed TLV that was proposed in the application and modeled; and

c. physical changes to the emissions unit or its exhaust parameters (e.g., increased/decreased exhaust flow, changes in stack height, changes in stack diameter, etc.).

If the permittee determines that the "Air Toxic Policy" will be satisfied for the above changes, the Ohio EPA will not consider the change(s) to be a "modification" under OAC rule 3745-31-01 solely due to the emissions of any type of toxic air contaminant not previously emitted, and a modification of the existing permit to install will not be required, even if the toxic air contaminant emissions are greater than the de minimis level in OAC rule 3745-15-05. If the change(s) is (are) defined as a modification under other provisions of the modification definition, then the permittee shall obtain a final permit to install prior to the change.

The permittee shall collect, record, and retain the following information when it conducts evaluations to determine that the changed emissions unit will satisfy the Air Toxic Policy:"

a. a description of the parameters changed(composition of materials, new pollutants emitted, change in stack/exhaust parameters, etc.);

b. documentation of it's evaluation and determination that the changed emissions unit still satisfies the "Air Toxic Policy"; and

c. when the computer modeling is performed, a copy of the resulting computer model runs that show the results of the application of the "Air Toxic Policy" for the change.

D. Reporting Requirements

1. The permittee shall submit quarterly deviation (excursion) reports to the Hamilton County Department of Environmental Services that identify all periods of time during which the following scrubber parameters were not maintained at or above the required levels:

   a. the scrubber water recirculation flow rate; and

   b. the scrubber water make-up flow rate.

   If no exceedances occurred during the reporting period then a report is required stating so. These reports shall be submitted by January 31, April 30, July 31, and October 31 of each year and shall cover the previous calendar quarters.

2. The permittee shall notify the Hamilton County Department of Environmental Services of any exceedance of the HAP emissions limitations set forth in term A.2.b. The reports shall be submitted to the Director (the Hamilton County Department of Environmental Services) by January 31, April 30, July 31 and October 31 of each year and shall cover the previous three calendar months (October through December, January through March, April through June and July through September, respectively.)

   If no exceedances occurred, the permittee shall state so in the report.

E. Testing Requirements

1. Emissions Limitations

   The hydrochloric acid (HCl) emissions shall not exceed 0.007 pound per hour (lb/hr)
   The hydrochloric acid (HCl) emissions shall not exceed 0.032 Tons per Year (TPY)

   Applicable Compliance Methods

Compliance with the hourly HCl emissions limitation shall be determined by the following calculations:

a. for the conversion of TCS to HCl in the scrubber:

actual trichlorosilane usage (lbs TCS/hr) x unit conversion trichlorosilane (1 mole TCS/135.4524 gMW TCS) x stoichiometric ratio (3 moles HCl/1 mole TCS) x unit conversion HCl (36.3609 gMW HCL/1 mole HCl) = lbs HCl/hr

b. for the addition of HCl in the hi-etch process:

actual cycle time (min/cycle) x actual production rate (cycles/hr) x actual flow rate (liters HCl/hr) x conversion factor (ft3/28.3168 liters) x conversion factor (1 lb HCl/9.7752 ft3 HCl) = lbs HCl/hr; and

c. (lbs HCl/hr from the conversion of TCS + lbs HCl/hr from the addition of HCl) x scrubber efficiency (1 - 99.5/100) = lbs HCl/hr from the scrubber stack

Compliance with the annual HCl emissions limitation shall be determined by the recordkeeping requirement in T&C C.2.h.

2. Emissions Limitation

Visible particulate emissions from any stack associated with emissions unit P046 shall not exceed 20 percent opacity, as a six-minute average, except as specified by rule

Applicable Compliance Method

Compliance shall be determined in accordance with Test Method 9 as set forth in "Appendix on Test Methods" in 40 CFR, Part 60 ("Standards of Performance for New Stationary Sources"), as such Appendix existed on July 1, 1996.

3. Emissions Limitations

9.9 TPY for any single HAP and 24.9 TPY for any combination of HAPs

Compliance with the HAPs emissions limits outlined in T&C A.2.b. shall be demonstrated by the recordkeeping requirements in T&C C.2.

4. Compliance with the operational restrictions for the wet scrubber in T&Cs B.1. and B.2. shall be demonstrated by the recordkeeping requirements in T&C C.1.

Emissions Unit ID: **P046**

F. Miscellaneous Requirements

1. The following terms and conditions of this permit are federally enforceable: A, B, C.1, C.2, D and E.

PART II - SPECIAL TERMS AND CONDITIONS FOR SPECIFIC EMISSIONS UNIT(S)

A. Applicable Emissions Limitations and/or Control Requirements

1. The specific operations(s), property, and/or equipment which constitute this emissions unit are listed in the following table along with the applicable rules and/or requirements and with the applicable emissions limitations and/or control measures. Emissions from this unit shall not exceed the listed limitations, and the listed control measures shall be specified in narrative form following the table.

Operations, Property, and/or Equipment	Applicable Rules/Requirements	OAC rule 3745-17-11(B)
P047 - A12 - ASM Single Wafer Reactor; S12 - OTE Fume Scrubber	OAC rule 3745-31-05(A)(3)	
	OAC rule 3745-31-05(C) (to avoid being subject to OAC rules 3745-31-28 and Title V permitting requirements)	
	OAC rule 3745-17-07(A)(1)	

Applicable Emissions Limitations/Control Measures	
The hydrochloric acid (HCl) emissions shall not exceed 0.007 pound per hour (lb/hr).	
The hydrochloric acid (HCl) emissions shall not exceed 0.032 Tons per Year (TPY).	See T&C A.2.c.
The requirements of this rule also include compliance with the requirements of OAC rule 3745-31-05(C) and OAC rule 3745-17-07(A)(1).	See T&C A.2.b.
Visible particulate emissions from any stack associated with emissions unit P047 shall not exceed 20 percent opacity, as a six-minute average, except as specified by rule.	
The emission limitation specified by this rule is less stringent than the emission limitation established pursuant to OAC rule 3745-31-05(A)(3).	

2. Additional Terms and Conditions

2.a The hourly emission limitations outlined in term A.1. are based upon the emissions unit's

potential to emit. Therefore, no hourly records are required to demonstrate compliance with these limits.

2.b The actual emissions of Hazardous Air Pollutants (HAPs), as identified in Section 112(b) of Title III of the Clean Air Act, from this facility shall not exceed 9.9 TPY for any single HAP and 24.9 TPY for any combination of HAPs. Compliance with the above limitations shall be based on a rolling, 12-month summation. The permittee has existing records to demonstrate compliance with these limits upon issuance of this permit.

2.c Compliance with OAC rule 3745-31-05(A)(3) shall be demonstrated by the use of a wet scrubber, compliance with the HCl emissions limits and compliance with the facility-wide HAPs emissions limits.

B. Operational Restrictions

1. The scrubber water recirculation flow rate shall be continuously maintained at a value of not less than 10 gallons per minute at all times while the emissions unit is in operation.

2. The scrubber water make-up flow rate shall be continuously maintained at a value of not less than 1 gallon per minute at all times while the emissions unit is in operation.

C. Monitoring and/or Recordkeeping Requirements

1. The permittee shall properly install, operate and maintain equipment to continuously monitor the scrubber water recirculation flow rate and the scrubber water make-up flow rate into the scrubber while the emissions unit is in operation. The monitoring devices and any recorders shall be installed, calibrated, operated and maintained in accordance with the manufacturer's recommendations, instructions and operating manuals.

   The permittee shall collect and record the following information each day:

   a. the scrubber water recirculation flow rate, in gallons per minute, on a once per day basis;

   b. the scrubber water make-up flow rate, in gallons per minute, on a once per day basis; and

   c. the operating times for the capture (collection) system, control device, monitoring equipment, and the associated emissions unit.

2. The permittee shall collect and record the following information each month for the entire facility:

   a. for all epitaxial reactors, the amount of hydrogen chloride (HCl) used (input), in pounds;

b. for all epitaxial reactors, the amount of HCl released from the reaction of trichlorosilane, in pounds;

c. for all epitaxial reactors, the amount of controlled emissions of each HAP, in tons;

d. for all emissions units, the amount of any other material used which contains HAPs, in tons;

e. for all emissions units, the individual HAP content for each HAP of each material used, in percent by weight (ton HAP/ton material);

f. the total individual HAP emissions for each HAP from all materials employed, in tons per month [for each HAP the sum of c. plus (d. times e.)];

g. the total combined HAP emissions from all materials employed, in tons per month (the sum of all HAPs as calculated in f.);

h. the updated rolling, 12-month summation of each individual HAP emissions, in pounds or tons. This shall include the information for the current month and the preceding eleven calender months ; and

i. the updated rolling, 12-month summation of total combined HAP emissions, in pounds or tons. This shall include the information for the current month and the preceding eleven calender months.

* A listing of the HAPs can be found in Section 112(b) of the Clean Air Act or can be obtained by contacting your Hamilton County Department of Environmental Services contact. This information does not have to be kept on a individual emissions unit basis.

3. The permit to install for emissions units P036 - P050 was evaluated based on the actual materials and the design parameters of the emissions unit's exhaust systems, as specified by the permittee in the permit to install application. The Ohio EPA's "Review of New Sources of Air Toxic Emissions" policy ("Air Toxic Policy") was applied for each pollutant emitted by this emissions unit using data from the permit to install application and the SCREEN 3.0 model (or other Ohio EPA approved model). The predicted 1-hour maximum ground-level concentration from the use of the SCREEN 3.0 model was compared to the Maximum Ground-Level Concentration (MAGLC).

The following summarizes the results of the modeling for the "worst case" pollutant(s):

Pollutant: HCl (CAS 7647-01-0)

TLV (ug/m^3): 2198

Maximum Hourly Emission Rate (lbs/hr): 0.105 lbs/hr HCl, P036 - P050, combined

Predicted 1-Hour Maximum Ground-Level Concentration (ug/m^3): 16.82 Ug/m^3, P036 - P050, combined

MAGLC (ug/m^3): 52.33

Physical changes to or in the method of operation of the emissions unit after it's installation or modification could affect the parameters used to determine whether or not the "Air Toxics Policy" is satisfied. Consequently, prior to making a change that could impact such parameters, the permittee shall conduct an evaluation to determine that the "Air Toxic Policy" will still be satisfied. If, upon evaluation, the permittee determines that the "Air Toxic Policy" will not be satisfied, the permittee will not make the change. Changes that can affect the parameters used in the "Air Toxic Policy" include the following:

a. changes in the composition of the materials used (typically for coatings or cleanup materials), or the use of new materials, that would result in the emission of a compound with a lower Threshold Limit Value (TLV), as indicated in the most recent version of the handbook entitled "American Conference of Governmental Industrial Hygienists (ACGIH)," than the lowest TLV value previously modeled;

b. changes in the composition of the materials, or use of new materials, that would result in an increase in emissions of any pollutant with a listed TLV that was proposed in the application and modeled; and

c. physical changes to the emissions unit or its exhaust parameters (e.g., increased/decreased exhaust flow, changes in stack height, changes in stack diameter, etc.).

If the permittee determines that the "Air Toxic Policy" will be satisfied for the above changes, the Ohio EPA will not consider the change(s) to be a "modification" under OAC rule 3745-31-01 solely due to the emissions of any type of toxic air contaminant not previously emitted, and a modification of the existing permit to install will not be required, even if the toxic air contaminant emissions are greater than the de minimis level in OAC rule 3745-15-05. If the change(s) is (are) defined as a modification under other provisions of the modification definition, then the permittee shall obtain a final permit to install prior to the change.

The permittee shall collect, record, and retain the following information when it conducts evaluations to determine that the changed emissions unit will satisfy the Air Toxic Policy:"

a. a description of the parameters changed(composition of materials, new pollutants emitted, change in stack/exhaust parameters, etc.);

b. documentation of it's evaluation and determination that the changed emissions unit still satisfies the "Air Toxic Policy"; and

c. when the computer modeling is performed, a copy of the resulting computer model runs that show the results of the application of the "Air Toxic Policy" for the change.

D. Reporting Requirements

1. The permittee shall submit quarterly deviation (excursion) reports to the Hamilton County Department of Environmental Services that identify all periods of time during which the following scrubber parameters were not maintained at or above the required levels:

   a. the scrubber water recirculation flow rate; and

   b. the scrubber water make-up flow rate.

   If no exceedances occurred during the reporting period then a report is required stating so. These reports shall be submitted by January 31, April 30, July 31, and October 31 of each year and shall cover the previous calendar quarters.

2. The permittee shall notify the Hamilton County Department of Environmental Services of any exceedance of the HAP emissions limitations set forth in term A.2.b. The reports shall be submitted to the Director (the Hamilton County Department of Environmental Services) by January 31, April 30, July 31 and October 31 of each year and shall cover the previous three calendar months (October through December, January through March, April through June and July through September, respectively.)

   If no exceedances occurred, the permittee shall state so in the report.

E. Testing Requirements

1. Emissions Limitations

   The hydrochloric acid (HCl) emissions shall not exceed 0.007 pound per hour (lb/hr)
   The hydrochloric acid (HCl) emissions shall not exceed 0.032 Tons per Year (TPY)

   Applicable Compliance Methods

Compliance with the hourly HCl emissions limitation shall be determined by the following calculations:

a. for the conversion of TCS to HCl in the scrubber:

actual trichlorosilane usage (lbs TCS/hr) x unit conversion trichlorosilane (1 mole TCS/135.4524 gMW TCS) x stoichiometric ratio (3 moles HCl/1 mole TCS) x unit conversion HCl (36.3609 gMW HCL/1 mole HCl) = lbs HCl/hr

b. for the addition of HCl in the hi-etch process:

actual cycle time (min/cycle) x actual production rate (cycles/hr) x actual flow rate (liters HCl/hr) x conversion factor (ft3/28.3168 liters) x conversion factor (1 lb HCl/9.7752 ft3 HCl) = lbs HCl/hr; and

c. (lbs HCl/hr from the conversion of TCS + lbs HCl/hr from the addition of HCl) x scrubber efficiency (1 - 99.5/100) = lbs HCl/hr from the scrubber stack

Compliance with the annual HCl emissions limitation shall be determined by the recordkeeping requirement in T&C C.2.h.

2. Emissions Limitation

Visible particulate emissions from any stack associated with emissions unit P047 shall not exceed 20 percent opacity, as a six-minute average, except as specified by rule

Applicable Compliance Method

Compliance shall be determined in accordance with Test Method 9 as set forth in "Appendix on Test Methods" in 40 CFR, Part 60 ("Standards of Performance for New Stationary Sources"), as such Appendix existed on July 1, 1996.

3. Emissions Limitations

9.9 TPY for any single HAP and 24.9 TPY for any combination of HAPs

Compliance with the HAPs emissions limits outlined in T&C A.2.b. shall be demonstrated by the recordkeeping requirements in T&C C.2.

4. Compliance with the operational restrictions for the wet scrubber in T&Cs B.1. and B.2. shall be demonstrated by the recordkeeping requirements in T&C C.1.

Emissions Unit ID: **P047**

F. Miscellaneous Requirements

1. The following terms and conditions of this permit are federally enforceable: A, B, C.1, C.2, D and E.

PART II - SPECIAL TERMS AND CONDITIONS FOR SPECIFIC EMISSIONS UNIT(S)

A. Applicable Emissions Limitations and/or Control Requirements

1. The specific operations(s), property, and/or equipment which constitute this emissions unit are listed in the following table along with the applicable rules and/or requirements and with the applicable emissions limitations and/or control measures. Emissions from this unit shall not exceed the listed limitations, and the listed control measures shall be specified in narrative form following the table.

Operations, Property, and/or Equipment	Applicable Rules/Requirements	OAC rule 3745-17-11(B)
P048 - A13 - ASM Single Wafer Reactor; S13 - OTE Fume Scrubber	OAC rule 3745-31-05(A)(3)	
	OAC rule 3745-31-05(C) (to avoid being subject to OAC rules 3745-31-28 and Title V permitting requirements)	
	OAC rule 3745-17-07(A)(1)	

Applicable Emissions Limitations/Control Measures
The hydrochloric acid (HCl) emissions shall not exceed 0.007 pound per hour (lb/hr).
The hydrochloric acid (HCl) emissions shall not exceed 0.032 Tons per Year (TPY). See T&C A.2.c.
The requirements of this rule also include compliance with the requirements of OAC rule 3745-31-05(C) and OAC rule 3745-17-07(A)(1). See T&C A.2.b.
Visible particulate emissions from any stack associated with emissions unit P048 shall not exceed 20 percent opacity, as a six-minute average, except as specified by rule.
The emission limitation specified by this rule is less stringent than the emission limitation established pursuant to OAC rule 3745-31-05(A)(3).

2. Additional Terms and Conditions

2.a The hourly emission limitations outlined in term A.1. are based upon the emissions unit's

potential to emit. Therefore, no hourly records are required to demonstrate compliance with these limits.

2.b The actual emissions of Hazardous Air Pollutants (HAPs), as identified in Section 112(b) of Title III of the Clean Air Act, from this facility shall not exceed 9.9 TPY for any single HAP and 24.9 TPY for any combination of HAPs. Compliance with the above limitations shall be based on a rolling, 12-month summation. The permittee has existing records to demonstrate compliance with these limits upon issuance of this permit.

2.c Compliance with OAC rule 3745-31-05(A)(3) shall be demonstrated by the use of a wet scrubber, compliance with the HCl emissions limits and compliance with the facility-wide HAPs emissions limits.

B. Operational Restrictions

1. The scrubber water recirculation flow rate shall be continuously maintained at a value of not less than 10 gallons per minute at all times while the emissions unit is in operation.

2. The scrubber water make-up flow rate shall be continuously maintained at a value of not less than 1 gallon per minute at all times while the emissions unit is in operation.

C. Monitoring and/or Recordkeeping Requirements

1. The permittee shall properly install, operate and maintain equipment to continuously monitor the scrubber water recirculation flow rate and the scrubber water make-up flow rate into the scrubber while the emissions unit is in operation. The monitoring devices and any recorders shall be installed, calibrated, operated and maintained in accordance with the manufacturer's recommendations, instructions and operating manuals.

   The permittee shall collect and record the following information each day:

   a. the scrubber water recirculation flow rate, in gallons per minute, on a once per day basis;

   b. the scrubber water make-up flow rate, in gallons per minute, on a once per day basis; and

   c. the operating times for the capture (collection) system, control device, monitoring equipment, and the associated emissions unit.

2. The permittee shall collect and record the following information each month for the entire facility:

   a. for all epitaxial reactors, the amount of hydrogen chloride (HCl) used (input), in pounds;

b. for all epitaxial reactors, the amount of HCl released from the reaction of trichlorosilane, in pounds;

c. for all epitaxial reactors, the amount of controlled emissions of each HAP, in tons;

d. for all emissions units, the amount of any other material used which contains HAPs, in tons;

e. for all emissions units, the individual HAP content for each HAP of each material used, in percent by weight (ton HAP/ton material);

f. the total individual HAP emissions for each HAP from all materials employed, in tons per month [for each HAP the sum of c. plus (d. times e.)];

g. the total combined HAP emissions from all materials employed, in tons per month (the sum of all HAPs as calculated in f.);

h. the updated rolling, 12-month summation of each individual HAP emissions, in pounds or tons. This shall include the information for the current month and the preceding eleven calender months ; and

i. the updated rolling, 12-month summation of total combined HAP emissions, in pounds or tons. This shall include the information for the current month and the preceding eleven calender months.

* A listing of the HAPs can be found in Section 112(b) of the Clean Air Act or can be obtained by contacting your Hamilton County Department of Environmental Services contact. This information does not have to be kept on a individual emissions unit basis.

3. The permit to install for emissions units P036 - P050 was evaluated based on the actual materials and the design parameters of the emissions unit's exhaust systems, as specified by the permittee in the permit to install application. The Ohio EPA's "Review of New Sources of Air Toxic Emissions" policy ("Air Toxic Policy") was applied for each pollutant emitted by this emissions unit using data from the permit to install application and the SCREEN 3.0 model (or other Ohio EPA approved model). The predicted 1-hour maximum ground-level concentration from the use of the SCREEN 3.0 model was compared to the Maximum Ground-Level Concentration (MAGLC).

The following summarizes the results of the modeling for the "worst case" pollutant(s):

Pollutant: HCl (CAS 7647-01-0)

TLV (ug/m^3): 2198

Maximum Hourly Emission Rate (lbs/hr): 0.105 lbs/hr HCl, P036 - P050, combined

Predicted 1-Hour Maximum Ground-Level Concentration (ug/m^3): 16.82 Ug/m^3, P036 - P050, combined

MAGLC (ug/m^3): 52.33

Physical changes to or in the method of operation of the emissions unit after it's installation or modification could affect the parameters used to determine whether or not the "Air Toxics Policy" is satisfied. Consequently, prior to making a change that could impact such parameters, the permittee shall conduct an evaluation to determine that the "Air Toxic Policy" will still be satisfied. If, upon evaluation, the permittee determines that the "Air Toxic Policy" will not be satisfied, the permittee will not make the change. Changes that can affect the parameters used in the "Air Toxic Policy" include the following:

a. changes in the composition of the materials used (typically for coatings or cleanup materials), or the use of new materials, that would result in the emission of a compound with a lower Threshold Limit Value (TLV), as indicated in the most recent version of the handbook entitled "American Conference of Governmental Industrial Hygienists (ACGIH)," than the lowest TLV value previously modeled;

b. changes in the composition of the materials, or use of new materials, that would result in an increase in emissions of any pollutant with a listed TLV that was proposed in the application and modeled; and

c. physical changes to the emissions unit or its exhaust parameters (e.g., increased/decreased exhaust flow, changes in stack height, changes in stack diameter, etc.).

If the permittee determines that the "Air Toxic Policy" will be satisfied for the above changes, the Ohio EPA will not consider the change(s) to be a "modification" under OAC rule 3745-31-01 solely due to the emissions of any type of toxic air contaminant not previously emitted, and a modification of the existing permit to install will not be required, even if the toxic air contaminant emissions are greater than the de minimis level in OAC rule 3745-15-05. If the change(s) is (are) defined as a modification under other provisions of the modification definition, then the permittee

shall obtain a final permit to install prior to the change.

The permittee shall collect, record, and retain the following information when it conducts evaluations to determine that the changed emissions unit will satisfy the Air Toxic Policy:"

a. a description of the parameters changed(composition of materials, new pollutants emitted, change in stack/exhaust parameters, etc.);

b. documentation of it's evaluation and determination that the changed emissions unit still satisfies the "Air Toxic Policy"; and

c. when the computer modeling is performed, a copy of the resulting computer model runs that show the results of the application of the "Air Toxic Policy" for the change.

D. Reporting Requirements

1. The permittee shall submit quarterly deviation (excursion) reports to the Hamilton County Department of Environmental Services that identify all periods of time during which the following scrubber parameters were not maintained at or above the required levels:

   a. the scrubber water recirculation flow rate; and

   b. the scrubber water make-up flow rate.

   If no exceedances occurred during the reporting period then a report is required stating so. These reports shall be submitted by January 31, April 30, July 31, and October 31 of each year and shall cover the previous calendar quarters.

2. The permittee shall notify the Hamilton County Department of Environmental Services of any exceedance of the HAP emissions limitations set forth in term A.2.b. The reports shall be submitted to the Director (the Hamilton County Department of Environmental Services) by January 31, April 30, July 31 and October 31 of each year and shall cover the previous three calendar months (October through December, January through March, April through June and July through September, respectively.)

   If no exceedances occurred, the permittee shall state so in the report.

E. Testing Requirements

1. Emissions Limitations

   The hydrochloric acid (HCl) emissions shall not exceed 0.007 pound per hour (lb/hr)

The hydrochloric acid (HCl) emissions shall not exceed 0.032 Tons per Year (TPY)

Applicable Compliance Methods

Compliance with the hourly HCl emissions limitation shall be determined by the following calculations:

a. for the conversion of TCS to HCl in the scrubber:

actual trichlorosilane usage (lbs TCS/hr) x unit conversion trichlorosilane (1 mole TCS/135.4524 gMW TCS) x stoichiometric ratio (3 moles HCl/1 mole TCS) x unit conversion HCl (36.3609 gMW HCL/1 mole HCl) = lbs HCl/hr

b. for the addition of HCl in the hi-etch process:

actual cycle time (min/cycle) x actual production rate (cycles/hr) x actual flow rate (liters HCl/hr) x conversion factor (ft3/28.3168 liters) x conversion factor (1 lb HCl/9.7752 ft3 HCl) = lbs HCl/hr; and

c. (lbs HCl/hr from the conversion of TCS + lbs HCl/hr from the addition of HCl) x scrubber efficiency (1 - 99.5/100) = lbs HCl/hr from the scrubber stack

Compliance with the annual HCl emissions limitation shall be determined by the recordkeeping requirement in T&C C.2.h.

2. Emissions Limitation

Visible particulate emissions from any stack associated with emissions unit P048 shall not exceed 20 percent opacity, as a six-minute average, except as specified by rule

Applicable Compliance Method

Compliance shall be determined in accordance with Test Method 9 as set forth in "Appendix on Test Methods" in 40 CFR, Part 60 ("Standards of Performance for New Stationary Sources"), as such Appendix existed on July 1, 1996.

3. Emissions Limitations

9.9 TPY for any single HAP and 24.9 TPY for any combination of HAPs

Compliance with the HAPs emissions limits outlined in T&C A.2.b. shall be demonstrated by the recordkeeping requirements in T&C C.2.

4. Compliance with the operational restrictions for the wet scrubber in T&Cs B.1. and B.2. shall be demonstrated by the recordkeeping requirements in T&C C.1.

F. Miscellaneous Requirements

1. The following terms and conditions of this permit are federally enforceable: A, B, C.1, C.2, D and E.

PART II - SPECIAL TERMS AND CONDITIONS FOR SPECIFIC EMISSIONS UNIT(S)

A. Applicable Emissions Limitations and/or Control Requirements

1. The specific operations(s), property, and/or equipment which constitute this emissions unit are listed in the following table along with the applicable rules and/or requirements and with the applicable emissions limitations and/or control measures. Emissions from this unit shall not exceed the listed limitations, and the listed control measures shall be specified in narrative form following the table.

Operations, Property, and/or Equipment	Applicable Rules/Requirements	OAC rule 3745-17-11(B)
P049 - A14 - ASM Single Wafer Reactor; S14 - OTE Fume Scrubber	OAC rule 3745-31-05(A)(3)	
	OAC rule 3745-31-05(C) (to avoid being subject to OAC rules 3745-31-28 and Title V permitting requirements)	
	OAC rule 3745-17-07(A)(1)	

Applicable Emissions Limitations/Control Measures	
The hydrochloric acid (HCl) emissions shall not exceed 0.007 pound per hour (lb/hr).	
The hydrochloric acid (HCl) emissions shall not exceed 0.032 Tons per Year (TPY).	See T&C A.2.c.
The requirements of this rule also include compliance with the requirements of OAC rule 3745-31-05(C) and OAC rule 3745-17-07(A)(1).	See T&C A.2.b.
Visible particulate emissions from any stack associated with emissions unit P049 shall not exceed 20 percent opacity, as a six-minute average, except as specified by rule.	
The emission limitation specified by this rule is less stringent than the emission limitation established pursuant to OAC rule 3745-31-05(A)(3).	

2. Additional Terms and Conditions

2.a The hourly emission limitations outlined in term A.1. are based upon the emissions unit's

potential to emit. Therefore, no hourly records are required to demonstrate compliance with these limits.

2.b The actual emissions of Hazardous Air Pollutants (HAPs), as identified in Section 112(b) of Title III of the Clean Air Act, from this facility shall not exceed 9.9 TPY for any single HAP and 24.9 TPY for any combination of HAPs. Compliance with the above limitations shall be based on a rolling, 12-month summation. The permittee has existing records to demonstrate compliance with these limits upon issuance of this permit.

2.c Compliance with OAC rule 3745-31-05(A)(3) shall be demonstrated by the use of a wet scrubber, compliance with the HCl emissions limits and compliance with the facility-wide HAPs emissions limits.

B. Operational Restrictions

1. The scrubber water recirculation flow rate shall be continuously maintained at a value of not less than 10 gallons per minute at all times while the emissions unit is in operation.

2. The scrubber water make-up flow rate shall be continuously maintained at a value of not less than 1 gallon per minute at all times while the emissions unit is in operation.

C. Monitoring and/or Recordkeeping Requirements

1. The permittee shall properly install, operate and maintain equipment to continuously monitor the scrubber water recirculation flow rate and the scrubber water make-up flow rate into the scrubber while the emissions unit is in operation. The monitoring devices and any recorders shall be installed, calibrated, operated and maintained in accordance with the manufacturer's recommendations, instructions and operating manuals.

   The permittee shall collect and record the following information each day:

   a. the scrubber water recirculation flow rate, in gallons per minute, on a once per day basis;

   b. the scrubber water make-up flow rate, in gallons per minute, on a once per day basis; and

   c. the operating times for the capture (collection) system, control device, monitoring equipment, and the associated emissions unit.

2. The permittee shall collect and record the following information each month for the entire facility:

   a. for all epitaxial reactors, the amount of hydrogen chloride (HCl) used (input), in pounds;

b. for all epitaxial reactors, the amount of HCl released from the reaction of trichlorosilane, in pounds;

c. for all epitaxial reactors, the amount of controlled emissions of each HAP, in tons;

d. for all emissions units, the amount of any other material used which contains HAPs, in tons;

e. for all emissions units, the individual HAP content for each HAP of each material used, in percent by weight (ton HAP/ton material);

f. the total individual HAP emissions for each HAP from all materials employed, in tons per month [for each HAP the sum of c. plus (d. times e.)];

g. the total combined HAP emissions from all materials employed, in tons per month (the sum of all HAPs as calculated in f.);

h. the updated rolling, 12-month summation of each individual HAP emissions, in pounds or tons. This shall include the information for the current month and the preceding eleven calender months ; and

i. the updated rolling, 12-month summation of total combined HAP emissions, in pounds or tons. This shall include the information for the current month and the preceding eleven calender months.

* A listing of the HAPs can be found in Section 112(b) of the Clean Air Act or can be obtained by contacting your Hamilton County Department of Environmental Services contact. This information does not have to be kept on a individual emissions unit basis.

3. The permit to install for emissions units P036 - P050 was evaluated based on the actual materials and the design parameters of the emissions unit's exhaust systems, as specified by the permittee in the permit to install application. The Ohio EPA's "Review of New Sources of Air Toxic Emissions" policy ("Air Toxic Policy") was applied for each pollutant emitted by this emissions unit using data from the permit to install application and the SCREEN 3.0 model (or other Ohio EPA approved model). The predicted 1-hour maximum ground-level concentration from the use of the SCREEN 3.0 model was compared to the Maximum Ground-Level Concentration (MAGLC).

The following summarizes the results of the modeling for the "worst case" pollutant(s):

Pollutant: HCl (CAS 7647-01-0)

TLV (ug/m^3): 2198

Maximum Hourly Emission Rate (lbs/hr): 0.105 lbs/hr HCl, P036 - P050, combined

Predicted 1-Hour Maximum Ground-Level Concentration (ug/m^3): 16.82 Ug/m^3, P036 - P050, combined

MAGLC (ug/m^3): 52.33

Physical changes to or in the method of operation of the emissions unit after it's installation or modification could affect the parameters used to determine whether or not the "Air Toxics Policy" is satisfied. Consequently, prior to making a change that could impact such parameters, the permittee shall conduct an evaluation to determine that the "Air Toxic Policy" will still be satisfied. If, upon evaluation, the permittee determines that the "Air Toxic Policy" will not be satisfied, the permittee will not make the change. Changes that can affect the parameters used in the "Air Toxic Policy" include the following:

a. changes in the composition of the materials used (typically for coatings or cleanup materials), or the use of new materials, that would result in the emission of a compound with a lower Threshold Limit Value (TLV), as indicated in the most recent version of the handbook entitled "American Conference of Governmental Industrial Hygienists (ACGIH)," than the lowest TLV value previously modeled;

b. changes in the composition of the materials, or use of new materials, that would result in an increase in emissions of any pollutant with a listed TLV that was proposed in the application and modeled; and

c. physical changes to the emissions unit or its exhaust parameters (e.g., increased/decreased exhaust flow, changes in stack height, changes in stack diameter, etc.).

If the permittee determines that the "Air Toxic Policy" will be satisfied for the above changes, the Ohio EPA will not consider the change(s) to be a "modification" under OAC rule 3745-31-01 solely due to the emissions of any type of toxic air contaminant not previously emitted, and a modification of the existing permit to install will not be required, even if the toxic air contaminant emissions are greater than the de minimis level in OAC rule 3745-15-05. If the change(s) is (are) defined as a modification under other provisions of the modification definition, then the permittee shall obtain a final permit to install prior to the change.

The permittee shall collect, record, and retain the following information when it conducts evaluations to determine that the changed emissions unit will satisfy the Air Toxic Policy:"

a. a description of the parameters changed(composition of materials, new pollutants emitted, change in stack/exhaust parameters, etc.);

b. documentation of it's evaluation and determination that the changed emissions unit still satisfies the "Air Toxic Policy"; and

c. when the computer modeling is performed, a copy of the resulting computer model runs that show the results of the application of the "Air Toxic Policy" for the change.

D. Reporting Requirements

1. The permittee shall submit quarterly deviation (excursion) reports to the Hamilton County Department of Environmental Services that identify all periods of time during which the following scrubber parameters were not maintained at or above the required levels:

   a. the scrubber water recirculation flow rate; and

   b. the scrubber water make-up flow rate.

   If no exceedances occurred during the reporting period then a report is required stating so. These reports shall be submitted by January 31, April 30, July 31, and October 31 of each year and shall cover the previous calendar quarters.

2. The permittee shall notify the Hamilton County Department of Environmental Services of any exceedance of the HAP emissions limitations set forth in term A.2.b. The reports shall be submitted to the Director (the Hamilton County Department of Environmental Services) by January 31, April 30, July 31 and October 31 of each year and shall cover the previous three calendar months (October through December, January through March, April through June and July through September, respectively.)

   If no exceedances occurred, the permittee shall state so in the report.

E. Testing Requirements

1. Emissions Limitations

   The hydrochloric acid (HCl) emissions shall not exceed 0.007 pound per hour (lb/hr)
   The hydrochloric acid (HCl) emissions shall not exceed 0.032 Tons per Year (TPY)

   Applicable Compliance Methods

Compliance with the hourly HCl emissions limitation shall be determined by the following calculations:

a. for the conversion of TCS to HCl in the scrubber:

actual trichlorosilane usage (lbs TCS/hr) x unit conversion trichlorosilane (1 mole TCS/135.4524 gMW TCS) x stoichiometric ratio (3 moles HCl/1 mole TCS) x unit conversion HCl (36.3609 gMW HCL/1 mole HCl) = lbs HCl/hr

b. for the addition of HCl in the hi-etch process:

actual cycle time (min/cycle) x actual production rate (cycles/hr) x actual flow rate (liters HCl/hr) x conversion factor (ft3/28.3168 liters) x conversion factor (1 lb HCl/9.7752 ft3 HCl) = lbs HCl/hr; and

c. (lbs HCl/hr from the conversion of TCS + lbs HCl/hr from the addition of HCl) x scrubber efficiency (1 - 99.5/100) = lbs HCl/hr from the scrubber stack

Compliance with the annual HCl emissions limitation shall be determined by the recordkeeping requirement in T&C C.2.h.

2. Emissions Limitation

Visible particulate emissions from any stack associated with emissions unit P049 shall not exceed 20 percent opacity, as a six-minute average, except as specified by rule

Applicable Compliance Method

Compliance shall be determined in accordance with Test Method 9 as set forth in "Appendix on Test Methods" in 40 CFR, Part 60 ("Standards of Performance for New Stationary Sources"), as such Appendix existed on July 1, 1996.

3. Emissions Limitations

9.9 TPY for any single HAP and 24.9 TPY for any combination of HAPs

Compliance with the HAPs emissions limits outlined in T&C A.2.b. shall be demonstrated by the recordkeeping requirements in T&C C.2.

4. Compliance with the operational restrictions for the wet scrubber in T&Cs B.1. and B.2. shall be demonstrated by the recordkeeping requirements in T&C C.1.

Emissions Unit ID: **P049**

F. Miscellaneous Requirements

1. The following terms and conditions of this permit are federally enforceable: A, B, C.1, C.2, D and E.

PART II - SPECIAL TERMS AND CONDITIONS FOR SPECIFIC EMISSIONS UNIT(S)

A. Applicable Emissions Limitations and/or Control Requirements

1. The specific operations(s), property, and/or equipment which constitute this emissions unit are listed in the following table along with the applicable rules and/or requirements and with the applicable emissions limitations and/or control measures. Emissions from this unit shall not exceed the listed limitations, and the listed control measures shall be specified in narrative form following the table.

Operations, Property, and/or Equipment	Applicable Rules/Requirements	OAC rule 3745-17-11(B)
P050 - A15 - ASM Single Wafer Reactor; S15 - OTE Fume Scrubber	OAC rule 3745-31-05(A)(3)	
	OAC rule 3745-31-05(C) (to avoid being subject to OAC rules 3745-31-28 and Title V permitting requirements)	
	OAC rule 3745-17-07(A)(1)	

Applicable Emissions Limitations/Control Measures
The hydrochloric acid (HCl) emissions shall not exceed 0.007 pound per hour (lb/hr).
The hydrochloric acid (HCl) emissions shall not exceed 0.032 Tons per Year (TPY). See T&C A.2.c.
The requirements of this rule also include compliance with the requirements of OAC rule 3745-31-05(C) and OAC rule 3745-17-07(A)(1). See T&C A.2.b.
Visible particulate emissions from any stack associated with emissions unit P050 shall not exceed 20 percent opacity, as a six-minute average, except as specified by rule.
The emission limitation specified by this rule is less stringent than the emission limitation established pursuant to OAC rule 3745-31-05(A)(3).

2. Additional Terms and Conditions

2.a The hourly emission limitations outlined in term A.1. are based upon the emissions unit's

potential to emit. Therefore, no hourly records are required to demonstrate compliance with these limits.

2.b The actual emissions of Hazardous Air Pollutants (HAPs), as identified in Section 112(b) of Title III of the Clean Air Act, from this facility shall not exceed 9.9 TPY for any single HAP and 24.9 TPY for any combination of HAPs. Compliance with the above limitations shall be based on a rolling, 12-month summation. The permittee has existing records to demonstrate compliance with these limits upon issuance of this permit.

2.c Compliance with OAC rule 3745-31-05(A)(3) shall be demonstrated by the use of a wet scrubber, compliance with the HCl emissions limits and compliance with the facility-wide HAPs emissions limits.

B. Operational Restrictions

1. The scrubber water recirculation flow rate shall be continuously maintained at a value of not less than 10 gallons per minute at all times while the emissions unit is in operation.

2. The scrubber water make-up flow rate shall be continuously maintained at a value of not less than 1 gallon per minute at all times while the emissions unit is in operation.

C. Monitoring and/or Recordkeeping Requirements

1. The permittee shall properly install, operate and maintain equipment to continuously monitor the scrubber water recirculation flow rate and the scrubber water make-up flow rate into the scrubber while the emissions unit is in operation. The monitoring devices and any recorders shall be installed, calibrated, operated and maintained in accordance with the manufacturer's recommendations, instructions and operating manuals.

   The permittee shall collect and record the following information each day:

   a. the scrubber water recirculation flow rate, in gallons per minute, on a once per day basis;

   b. the scrubber water make-up flow rate, in gallons per minute, on a once per day basis; and

   c. the operating times for the capture (collection) system, control device, monitoring equipment, and the associated emissions unit.

2. The permittee shall collect and record the following information each month for the entire facility:

   a. for all epitaxial reactors, the amount of hydrogen chloride (HCl) used (input), in pounds;

b. for all epitaxial reactors, the amount of HCl released from the reaction of trichlorosilane, in pounds;

c. for all epitaxial reactors, the amount of controlled emissions of each HAP, in tons;

d. for all emissions units, the amount of any other material used which contains HAPs, in tons;

e. for all emissions units, the individual HAP content for each HAP of each material used, in percent by weight (ton HAP/ton material);

f. the total individual HAP emissions for each HAP from all materials employed, in tons per month [for each HAP the sum of c. plus (d. times e.)];

g. the total combined HAP emissions from all materials employed, in tons per month (the sum of all HAPs as calculated in f.);

h. the updated rolling, 12-month summation of each individual HAP emissions, in pounds or tons. This shall include the information for the current month and the preceding eleven calender months ; and

i. the updated rolling, 12-month summation of total combined HAP emissions, in pounds or tons. This shall include the information for the current month and the preceding eleven calender months.

* A listing of the HAPs can be found in Section 112(b) of the Clean Air Act or can be obtained by contacting your Hamilton County Department of Environmental Services contact. This information does not have to be kept on a individual emissions unit basis.

3. The permit to install for emissions units P036 - P050 was evaluated based on the actual materials and the design parameters of the emissions unit's exhaust systems, as specified by the permittee in the permit to install application. The Ohio EPA's "Review of New Sources of Air Toxic Emissions" policy ("Air Toxic Policy") was applied for each pollutant emitted by this emissions unit using data from the permit to install application and the SCREEN 3.0 model (or other Ohio EPA approved model). The predicted 1-hour maximum ground-level concentration from the use of the SCREEN 3.0 model was compared to the Maximum Ground-Level Concentration (MAGLC).

The following summarizes the results of the modeling for the "worst case" pollutant(s):

Pollutant: HCl (CAS 7647-01-0)

TLV (ug/m^3): 2198

Maximum Hourly Emission Rate (lbs/hr): 0.105 lbs/hr HCl, P036 - P050, combined

Predicted 1-Hour Maximum Ground-Level Concentration (ug/m^3): 16.82 Ug/m^3, P036 - P050, combined

MAGLC (ug/m^3): 52.33

Physical changes to or in the method of operation of the emissions unit after it's installation or modification could affect the parameters used to determine whether or not the "Air Toxics Policy" is satisfied. Consequently, prior to making a change that could impact such parameters, the permittee shall conduct an evaluation to determine that the "Air Toxic Policy" will still be satisfied. If, upon evaluation, the permittee determines that the "Air Toxic Policy" will not be satisfied, the permittee will not make the change. Changes that can affect the parameters used in the "Air Toxic Policy" include the following:

a. changes in the composition of the materials used (typically for coatings or cleanup materials), or the use of new materials, that would result in the emission of a compound with a lower Threshold Limit Value (TLV), as indicated in the most recent version of the handbook entitled "American Conference of Governmental Industrial Hygienists (ACGIH)," than the lowest TLV value previously modeled;

b. changes in the composition of the materials, or use of new materials, that would result in an increase in emissions of any pollutant with a listed TLV that was proposed in the application and modeled; and

c. physical changes to the emissions unit or its exhaust parameters (e.g., increased/decreased exhaust flow, changes in stack height, changes in stack diameter, etc.).

If the permittee determines that the "Air Toxic Policy" will be satisfied for the above changes, the Ohio EPA will not consider the change(s) to be a "modification" under OAC rule 3745-31-01 solely due to the emissions of any type of toxic air contaminant not previously emitted, and a modification of the existing permit to install will not be required, even if the toxic air contaminant emissions are greater than the de minimis level in OAC rule 3745-15-05. If the change(s) is (are) defined as a modification under other provisions of the modification definition, then the permittee shall obtain a final permit to install prior to the change.

The permittee shall collect, record, and retain the following information when it conducts evaluations to determine that the changed emissions unit will satisfy the Air Toxic Policy:"

a. a description of the parameters changed(composition of materials, new pollutants emitted, change in stack/exhaust parameters, etc.);

b. documentation of it's evaluation and determination that the changed emissions unit still satisfies the "Air Toxic Policy"; and

c. when the computer modeling is performed, a copy of the resulting computer model runs that show the results of the application of the "Air Toxic Policy" for the change.

D. Reporting Requirements

1. The permittee shall submit quarterly deviation (excursion) reports to the Hamilton County Department of Environmental Services that identify all periods of time during which the following scrubber parameters were not maintained at or above the required levels:

   a. the scrubber water recirculation flow rate; and

   b. the scrubber water make-up flow rate.

   If no exceedances occurred during the reporting period then a report is required stating so. These reports shall be submitted by January 31, April 30, July 31, and October 31 of each year and shall cover the previous calendar quarters.

2. The permittee shall notify the Hamilton County Department of Environmental Services of any exceedance of the HAP emissions limitations set forth in term A.2.b. The reports shall be submitted to the Director (the Hamilton County Department of Environmental Services) by January 31, April 30, July 31 and October 31 of each year and shall cover the previous three calendar months (October through December, January through March, April through June and July through September, respectively.)

   If no exceedances occurred, the permittee shall state so in the report.

E. Testing Requirements

1. Emissions Limitations

   The hydrochloric acid (HCl) emissions shall not exceed 0.007 pound per hour (lb/hr)
   The hydrochloric acid (HCl) emissions shall not exceed 0.032 Tons per Year (TPY)

   Applicable Compliance Methods

Compliance with the hourly HCl emissions limitation shall be determined by the following calculations:

a. for the conversion of TCS to HCl in the scrubber:

actual trichlorosilane usage (lbs TCS/hr) x unit conversion trichlorosilane (1 mole TCS/135.4524 gMW TCS) x stoichiometric ratio (3 moles HCl/1 mole TCS) x unit conversion HCl (36.3609 gMW HCL/1 mole HCl) = lbs HCl/hr

b. for the addition of HCl in the hi-etch process:

actual cycle time (min/cycle) x actual production rate (cycles/hr) x actual flow rate (liters HCl/hr) x conversion factor (ft3/28.3168 liters) x conversion factor (1 lb HCl/9.7752 ft3 HCl) = lbs HCl/hr; and

c. (lbs HCl/hr from the conversion of TCS + lbs HCl/hr from the addition of HCl) x scrubber efficiency (1 - 99.5/100) = lbs HCl/hr from the scrubber stack

Compliance with the annual HCl emissions limitation shall be determined by the recordkeeping requirement in T&C C.2.h.

2. Emissions Limitation

Visible particulate emissions from any stack associated with emissions unit P050 shall not exceed 20 percent opacity, as a six-minute average, except as specified by rule

Applicable Compliance Method

Compliance shall be determined in accordance with Test Method 9 as set forth in "Appendix on Test Methods" in 40 CFR, Part 60 ("Standards of Performance for New Stationary Sources"), as such Appendix existed on July 1, 1996.

3. Emissions Limitations

9.9 TPY for any single HAP and 24.9 TPY for any combination of HAPs

Compliance with the HAPs emissions limits outlined in T&C A.2.b. shall be demonstrated by the recordkeeping requirements in T&C C.2.

4. Compliance with the operational restrictions for the wet scrubber in T&Cs B.1. and B.2. shall be demonstrated by the recordkeeping requirements in T&C C.1.

Emissions Unit ID: **P050**

F. Miscellaneous Requirements

1. The following terms and conditions of this permit are federally enforceable: A, B, C.1, C.2, D and E.

PART II - SPECIAL TERMS AND CONDITIONS FOR SPECIFIC EMISSIONS UNIT(S)

A. Applicable Emissions Limitations and/or Control Requirements

1. The specific operations(s), property, and/or equipment which constitute this emissions unit are listed in the following table along with the applicable rules and/or requirements and with the applicable emissions limitations and/or control measures. Emissions from this unit shall not exceed the listed limitations, and the listed control measures shall be specified in narrative form following the table.

Operations, Property, and/or Equipment	Applicable Rules/Requirements	OAC rule 3745-17-11(B)
P051 - B05 - AMT Barrel Reactor; CS-2 - Plant-wide condenser, scrubber, and hydrogen recovery unit	OAC rule 3745-31-05(A)(3)	
	OAC rule 3745-31-05(C) (to avoid being subject to OAC rules 3745-31-28 and Title V permitting requirements)	
	OAC rule 3745-17-07(A)(1)	

Applicable Emissions Limitations/Control Measures
The hydrochloric acid (HCl) emissions shall not exceed 0.001 pound per hour (lb/hr).
The hydrochloric acid (HCl) emissions shall not exceed 0.002 Tons per Year (TPY). See T&C A.2.c.
The requirements of this rule also include compliance with the requirements of OAC rule 3745-31-05(C) and OAC rule 3745-17-07(A)(1). See T&C A.2.b.
Visible particulate emissions from any stack associated with emissions unit P051 shall not exceed 20 percent opacity, as a six-minute average, except as specified by rule.
The emission limitation specified by this rule is less stringent than the emission limitation established pursuant to OAC rule 3745-31-05(A)(3).

2. Additional Terms and Conditions

2.a The hourly emission limitations outlined in term A.1. are based upon the emissions unit's

potential to emit. Therefore, no hourly records are required to demonstrate compliance with these limits.

2.b The actual emissions of Hazardous Air Pollutants (HAPs), as identified in Section 112(b) of Title III of the Clean Air Act, from this facility shall not exceed 9.9 TPY for any single HAP and 24.9 TPY for any combination of HAPs. Compliance with the above limitations shall be based on a rolling, 12-month summation. The permittee has existing records to demonstrate compliance with these limits upon issuance of this permit.

2.c Compliance with OAC rule 3745-31-05(A)(3) shall be demonstrated by the use of a wet scrubber, compliance with the HCl emissions limits and compliance with the facility-wide HAPs emissions limits.

B. Operational Restrictions

1. The scrubber water recirculation flow rate shall be continuously maintained at a value of not less than 60 gallons per minute at all times while the emissions unit is in operation.

2. The pH of the scrubbing liquor shall be maintained within the range of 8-13 at all times while the emissions unit is in operation.

C. Monitoring and/or Recordkeeping Requirements

1. The permittee shall properly install, operate and maintain equipment to continuously monitor the scrubber water recirculation flow rate into the scrubber and the pH of the scrubber liquor while the emissions unit is in operation. The monitoring devices and any recorders shall be installed, calibrated, operated and maintained in accordance with the manufacturer's recommendations, instructions and operating manuals.

   The permittee shall collect and record the following information each day:

   a. the scrubber water recirculation flow rate, in gallons per minute, on a once per day basis;

   b. the pH of the scrubber liquor, on a once per day basis; and

   c. the operating times for the capture (collection) system, control device, monitoring equipment, and the associated emissions unit.

2. The permittee shall collect and record the following information each month for the entire facility:

   a. for all epitaxial reactors, the amount of hydrogen chloride (HCl) used (input), in pounds;

b. for all epitaxial reactors, the amount of HCl released from the reaction of trichlorosilane, in pounds;

c. for all epitaxial reactors, the amount of controlled emissions of each HAP, in tons;

d. for all emissions units, the amount of any other material used which contains HAPs, in tons;

e. for all emissions units, the individual HAP content for each HAP of each material used, in percent by weight (ton HAP/ton material);

f. the total individual HAP emissions for each HAP from all materials employed, in tons per month [for each HAP the sum of c. plus (d. times e.)];

g. the total combined HAP emissions from all materials employed, in tons per month (the sum of all HAPs as calculated in f.);

h. the updated rolling, 12-month summation of each individual HAP emissions, in pounds or tons. This shall include the information for the current month and the preceding eleven calender months ; and

i. the updated rolling, 12-month summation of total combined HAP emissions, in pounds or tons. This shall include the information for the current month and the preceding eleven calender months.

* A listing of the HAPs can be found in Section 112(b) of the Clean Air Act or can be obtained by contacting your Hamilton County Department of Environmental Services contact. This information does not have to be kept on a individual emissions unit basis.

3. The permit to install for emissions units P024 - P035 and P051 - P074 was evaluated based on the actual materials (typically coatings and cleanup materials) and the design parameters of the emissions unit's exhaust systems, as specified by the permittee in the permit to install application. The Ohio EPA's "Review of New Sources of Air Toxic Emissions" policy ("Air Toxic Policy") was applied for each pollutant emitted by this emissions unit using data from the permit to install application and the SCREEN 3.0 model (or other Ohio EPA approved model). The predicted 1-hour maximum ground-level concentration from the use of the SCREEN 3.0 model was compared to the Maximum Ground-Level Concentration (MAGLC).

The following summarizes the results of the modeling for the "worst case" pollutant(s):

Pollutant: HCl (CAS 7647-01-0)

TLV (ug/m^3): 2198

Maximum Hourly Emission Rate (lbs/hr): 0.132 lbs/hr HCl, P024 - P035 and P051 - P074, combined

Predicted 1-Hour Maximum Ground-Level Concentration (ug/m^3): 30.68 Ug/m^3, P024 - P035 and P051 - P074, combined

MAGLC (ug/m^3): 52.33

Physical changes to or in the method of operation of the emissions unit after it's installation or modification could affect the parameters used to determine whether or not the "Air Toxics Policy" is satisfied. Consequently, prior to making a change that could impact such parameters, the permittee shall conduct an evaluation to determine that the "Air Toxic Policy" will still be satisfied. If, upon evaluation, the permittee determines that the "Air Toxic Policy" will not be satisfied, the permittee will not make the change. Changes that can affect the parameters used in the "Air Toxic Policy" include the following:

a. changes in the composition of the materials used (typically for coatings or cleanup materials), or the use of new materials, that would result in the emission of a compound with a lower Threshold Limit Value (TLV), as indicated in the most recent version of the handbook entitled "American Conference of Governmental Industrial Hygienists (ACGIH)," than the lowest TLV value previously modeled;

b. changes in the composition of the materials, or use of new materials, that would result in an increase in emissions of any pollutant with a listed TLV that was proposed in the application and modeled; and

c. physical changes to the emissions unit or its exhaust parameters (e.g., increased/decreased exhaust flow, changes in stack height, changes in stack diameter, etc.).

If the permittee determines that the "Air Toxic Policy" will be satisfied for the above changes, the Ohio EPA will not consider the change(s) to be a "modification" under OAC rule 3745-31-01 solely due to the emissions of any type of toxic air contaminant not previously emitted, and a modification of the existing permit to install will not be required, even if the toxic air contaminant emissions are greater than the de minimis level in OAC rule 3745-15-05. If the change(s) is (are) defined as a modification under other provisions of the modification definition, then the permittee shall obtain a final permit to install prior to the change.

The permittee shall collect, record, and retain the following information when it conducts

evaluations to determine that the changed emissions unit will satisfy the Air Toxic Policy:"

a. a description of the parameters changed(composition of materials, new pollutants emitted, change in stack/exhaust parameters, etc.);

b. documentation of it's evaluation and determination that the changed emissions unit still satisfies the "Air Toxic Policy"; and

c. when the computer modeling is performed, a copy of the resulting computer model runs that show the results of the application of the "Air Toxic Policy" for the change.

D. Reporting Requirements

1. The permittee shall submit quarterly deviation (excursion) reports to the Hamilton County Department of Environmental Services that identify all periods of time during which the following scrubber parameters were not maintained within the requirements of the Operational Restrictions:

   a. the scrubber water recirculation flow rate; and

   b. the scrubber solution pH.

   If no exceedances occurred during the reporting period then a report is required stating so. These reports shall be submitted by January 31, April 30, July 31, and October 31 of each year and shall cover the previous calendar quarters.

2. The permittee shall notify the Hamilton County Department of Environmental Services of any exceedance of the HAP emissions limitations set forth in term A.2.b. The reports shall be submitted to the Director (the Hamilton County Department of Environmental Services) by January 31, April 30, July 31 and October 31 of each year and shall cover the previous three calendar months (October through December, January through March, April through June and July through September, respectively.)

   If no exceedances occurred, the permittee shall state so in the report.

E. Testing Requirements

1. Emissions Limitations

   The hydrochloric acid (HCl) emissions shall not exceed 0.001 pound per hour (lb/hr)
   The hydrochloric acid (HCl) emissions shall not exceed 0.002 Tons per Year (TPY)

Applicable Compliance Methods

Compliance with the hourly HCl emissions limitation shall be determined by the following calculations:

a. for the conversion of TCS to HCl in the scrubber:

actual trichlorosilane usage (lbs TCS/hr) x unit conversion trichlorosilane (1 mole TCS/135.4524 gMW TCS) x stoichiometric ratio (3 moles HCl/1 mole TCS) x unit conversion HCl (36.3609 gMW HCL/1 mole HCl) = lbs HCl/hr

b. for the addition of HCl in the hi-etch process:

actual cycle time (min/cycle) x actual production rate (cycles/hr) x actual flow rate (liters HCl/hr) x conversion factor (ft3/28.3168 liters) x conversion factor (1 lb HCl/9.7752 ft3 HCl) = lbs HCl/hr; and

c. (lbs HCl/hr from the conversion of TCS + lbs HCl/hr from the addition of HCl) x scrubber efficiency (1 - 99.5/100) = lbs HCl/hr from the scrubber stack

Compliance with the annual HCl emissions limitation shall be determined by the recordkeeping requirement in T&C C.2.h.

2. Emissions Limitation

Visible particulate emissions from any stack associated with emissions unit P051 shall not exceed 20 percent opacity, as a six-minute average, except as specified by rule

Applicable Compliance Method

Compliance shall be determined in accordance with Test Method 9 as set forth in "Appendix on Test Methods" in 40 CFR, Part 60 ("Standards of Performance for New Stationary Sources"), as such Appendix existed on July 1, 1996.

3. Emissions Limitations

9.9 TPY for any single HAP and 24.9 TPY for any combination of HAPs

Compliance with the HAPs emissions limits outlined in T&C A.2.b. shall be demonstrated by the recordkeeping requirements in T&C C.2.

4. Compliance with the operational restrictions for the wet scrubber in T&Cs B.1. and B.2. shall be demonstrated by the recordkeeping requirements in T&C C.1.

F. Miscellaneous Requirements

1. The following terms and conditions of this permit are federally enforceable: A, B, C.1, C.2, D and E.

PART II - SPECIAL TERMS AND CONDITIONS FOR SPECIFIC EMISSIONS UNIT(S)

A. Applicable Emissions Limitations and/or Control Requirements

1. The specific operations(s), property, and/or equipment which constitute this emissions unit are listed in the following table along with the applicable rules and/or requirements and with the applicable emissions limitations and/or control measures. Emissions from this unit shall not exceed the listed limitations, and the listed control measures shall be specified in narrative form following the table.

Operations, Property, and/or Equipment	Applicable Rules/Requirements	
P052 - B06 - AMT Barrel Reactor; CS-2 - Plant-wide condenser, scrubber, and hydrogen recovery unit	OAC rule 3745-31-05(A)(3)	OAC rule 3745-17-11(B)
	OAC rule 3745-31-05(C) (to avoid being subject to OAC rules 3745-31-28 and Title V permitting requirements).	
	OAC rule 3745-17-07(A)(1)	

Applicable Emissions Limitations/Control Measures
The hydrochloric acid (HCl) emissions shall not exceed 0.001 pound per hour (lb/hr).
The hydrochloric acid (HCl) emissions shall not exceed 0.002 Tons per Year (TPY). See T&C A.2.c.
The requirements of this rule also include compliance with the requirements of OAC rule 3745-31-05(C) and OAC rule 3745-17-07(A)(1). See T&C A.2.b.
Visible particulate emissions from any stack associated with emissions unit P052 shall not exceed 20 percent opacity, as a six-minute average, except as specified by rule.
The emission limitation specified by this rule is less stringent than the emission limitation established pursuant to OAC rule 3745-31-05(A)(3).

2. Additional Terms and Conditions

2.a The hourly emission limitations outlined in term A.1. are based upon the emissions unit's potential to emit. Therefore, no hourly records are required to demonstrate compliance with these limits.

2.b The actual emissions of Hazardous Air Pollutants (HAPs), as identified in Section 112(b) of Title III of the Clean Air Act, from this facility shall not exceed 9.9 TPY for any single HAP and 24.9 TPY for any combination of HAPs. Compliance with the above limitations shall be based on a rolling, 12-month summation. The permittee has existing records to demonstrate compliance with these limits upon issuance of this permit.

2.c Compliance with OAC rule 3745-31-05(A)(3) shall be demonstrated by the use of a wet scrubber, compliance with the HCl emissions limits and compliance with the facility-wide HAPs emissions limits.

B. Operational Restrictions

1. The scrubber water recirculation flow rate shall be continuously maintained at a value of not less than 60 gallons per minute at all times while the emissions unit is in operation.

2. The pH of the scrubbing liquor shall be maintained within the range of 8-13 at all times while the emissions unit is in operation.

C. Monitoring and/or Recordkeeping Requirements

1. The permittee shall properly install, operate and maintain equipment to continuously monitor the scrubber water recirculation flow rate into the scrubber and the pH of the scrubber liquor while the emissions unit is in operation. The monitoring devices and any recorders shall be installed, calibrated, operated and maintained in accordance with the manufacturer's recommendations, instructions and operating manuals.

   The permittee shall collect and record the following information each day:

   a. the scrubber water recirculation flow rate, in gallons per minute, on a once per day basis;

   b. the pH of the scrubber liquor, on a once per day basis; and

   c. the operating times for the capture (collection) system, control device, monitoring equipment, and the associated emissions unit.

2. The permittee shall collect and record the following information each month for the entire facility:

   a. for all epitaxial reactors, the amount of hydrogen chloride (HCl) used (input), in pounds;

   b. for all epitaxial reactors, the amount of HCl released from the reaction of trichlorosilane,

in pounds;

c. for all epitaxial reactors, the amount of controlled emissions of each HAP, in tons;

d. for all emissions units, the amount of any other material used which contains HAPs, in tons;

e. for all emissions units, the individual HAP content for each HAP of each material used, in percent by weight (ton HAP/ton material);

f. the total individual HAP emissions for each HAP from all materials employed, in tons per month [for each HAP the sum of c. plus (d. times e.)];

g. the total combined HAP emissions from all materials employed, in tons per month (the sum of all HAPs as calculated in f.);

h. the updated rolling, 12-month summation of each individual HAP emissions, in pounds or tons. This shall include the information for the current month and the preceding eleven calender months ; and

i. the updated rolling, 12-month summation of total combined HAP emissions, in pounds or tons. This shall include the information for the current month and the preceding eleven calender months.

* A listing of the HAPs can be found in Section 112(b) of the Clean Air Act or can be obtained by contacting your Hamilton County Department of Environmental Services contact. This information does not have to be kept on a individual emissions unit basis.

3. The permit to install for emissions units P024 - P035 and P051 - P074 was evaluated based on the actual materials (typically coatings and cleanup materials) and the design parameters of the emissions unit's exhaust systems, as specified by the permittee in the permit to install application. The Ohio EPA's "Review of New Sources of Air Toxic Emissions" policy ("Air Toxic Policy") was applied for each pollutant emitted by this emissions unit using data from the permit to install application and the SCREEN 3.0 model (or other Ohio EPA approved model). The predicted 1-hour maximum ground-level concentration from the use of the SCREEN 3.0 model was compared to the Maximum Ground-Level Concentration (MAGLC).

The following summarizes the results of the modeling for the "worst case" pollutant(s):

Pollutant: HCl (CAS 7647-01-0)

TLV (ug/m^3): 2198

Maximum Hourly Emission Rate (lbs/hr): 0.132 lbs/hr HCl, P024 - P035 and P051 - P074, combined

Predicted 1-Hour Maximum Ground-Level Concentration (ug/m^3): 30.68 Ug/m^3, P024 - P035 and P051 - P074, combined

MAGLC (ug/m^3): 52.33

Physical changes to or in the method of operation of the emissions unit after it's installation or modification could affect the parameters used to determine whether or not the "Air Toxics Policy" is satisfied. Consequently, prior to making a change that could impact such parameters, the permittee shall conduct an evaluation to determine that the "Air Toxic Policy" will still be satisfied. If, upon evaluation, the permittee determines that the "Air Toxic Policy" will not be satisfied, the permittee will not make the change. Changes that can affect the parameters used in the "Air Toxic Policy" include the following:

a. changes in the composition of the materials used (typically for coatings or cleanup materials), or the use of new materials, that would result in the emission of a compound with a lower Threshold Limit Value (TLV), as indicated in the most recent version of the handbook entitled "American Conference of Governmental Industrial Hygienists (ACGIH)," than the lowest TLV value previously modeled;

b. changes in the composition of the materials, or use of new materials, that would result in an increase in emissions of any pollutant with a listed TLV that was proposed in the application and modeled; and

c. physical changes to the emissions unit or its exhaust parameters (e.g., increased/decreased exhaust flow, changes in stack height, changes in stack diameter, etc.).

If the permittee determines that the "Air Toxic Policy" will be satisfied for the above changes, the Ohio EPA will not consider the change(s) to be a "modification" under OAC rule 3745-31-01 solely due to the emissions of any type of toxic air contaminant not previously emitted, and a modification of the existing permit to install will not be required, even if the toxic air contaminant emissions are greater than the de minimis level in OAC rule 3745-15-05. If the change(s) is (are) defined as a modification under other provisions of the modification definition, then the permittee shall obtain a final permit to install prior to the change.

The permittee shall collect, record, and retain the following information when it conducts evaluations to determine that the changed emissions unit will satisfy the Air Toxic Policy:"

a. a description of the parameters changed(composition of materials, new pollutants emitted, change in stack/exhaust parameters, etc.);

b. documentation of it's evaluation and determination that the changed emissions unit still satisfies the "Air Toxic Policy"; and

c. when the computer modeling is performed, a copy of the resulting computer model runs that show the results of the application of the "Air Toxic Policy" for the change.

D. Reporting Requirements

1. The permittee shall submit quarterly deviation (excursion) reports to the Hamilton County Department of Environmental Services that identify all periods of time during which the following scrubber parameters were not maintained within the requirements of the Operational Restrictions:

   a. the scrubber water recirculation flow rate; and

   b. the scrubber solution pH.

   If no exceedances occurred during the reporting period then a report is required stating so. These reports shall be submitted by January 31, April 30, July 31, and October 31 of each year and shall cover the previous calendar quarters.

2. The permittee shall notify the Hamilton County Department of Environmental Services of any exceedance of the HAP emissions limitations set forth in term A.2.b. The reports shall be submitted to the Director (the Hamilton County Department of Environmental Services) by January 31, April 30, July 31 and October 31 of each year and shall cover the previous three calendar months (October through December, January through March, April through June and July through September, respectively.)

   If no exceedances occurred, the permittee shall state so in the report.

E. Testing Requirements

1. Emissions Limitations

   The hydrochloric acid (HCl) emissions shall not exceed 0.001 pound per hour (lb/hr)
   The hydrochloric acid (HCl) emissions shall not exceed 0.002 Tons per Year (TPY)

   Applicable Compliance Methods

   Compliance with the hourly HCl emissions limitation shall be determined by the following

calculations:

a. for the conversion of TCS to HCl in the scrubber:

actual trichlorosilane usage (lbs TCS/hr) x unit conversion trichlorosilane (1 mole TCS/135.4524 gMW TCS) x stoichiometric ratio (3 moles HCl/1 mole TCS) x unit conversion HCl (36.3609 gMW HCL/1 mole HCl) = lbs HCl/hr

b. for the addition of HCl in the hi-etch process:

actual cycle time (min/cycle) x actual production rate (cycles/hr) x actual flow rate (liters HCl/hr) x conversion factor (ft3/28.3168 liters) x conversion factor (1 lb HCl/9.7752 ft3 HCl) = lbs HCl/hr; and

c. (lbs HCl/hr from the conversion of TCS + lbs HCl/hr from the addition of HCl) x scrubber efficiency (1 - 99.5/100) = lbs HCl/hr from the scrubber stack

Compliance with the annual HCl emissions limitation shall be determined by the recordkeeping requirement in T&C C.2.h.

2. Emissions Limitation

Visible particulate emissions from any stack associated with emissions unit P052 shall not exceed 20 percent opacity, as a six-minute average, except as specified by rule

Applicable Compliance Method

Compliance shall be determined in accordance with Test Method 9 as set forth in "Appendix on Test Methods" in 40 CFR, Part 60 ("Standards of Performance for New Stationary Sources"), as such Appendix existed on July 1, 1996.

3. Emissions Limitations

9.9 TPY for any single HAP and 24.9 TPY for any combination of HAPs

Compliance with the HAPs emissions limits outlined in T&C A.2.b. shall be demonstrated by the recordkeeping requirements in T&C C.2.

4. Compliance with the operational restrictions for the wet scrubber in T&Cs B.1. and B.2. shall be demonstrated by the recordkeeping requirements in T&C C.1.

F. Miscellaneous Requirements

1. The following terms and conditions of this permit are federally enforceable: A, B, C.1, C.2, D and E.

PART II - SPECIAL TERMS AND CONDITIONS FOR SPECIFIC EMISSIONS UNIT(S)

A. Applicable Emissions Limitations and/or Control Requirements

1. The specific operations(s), property, and/or equipment which constitute this emissions unit are listed in the following table along with the applicable rules and/or requirements and with the applicable emissions limitations and/or control measures. Emissions from this unit shall not exceed the listed limitations, and the listed control measures shall be specified in narrative form following the table.

Operations, Property, and/or Equipment	Applicable Rules/Requirements	
P053 - B07 - AMT Barrel Reactor; CS-2 - Plant-wide condenser, scrubber, and hydrogen recovery unit	OAC rule 3745-31-05(A)(3)	OAC rule 3745-17-11(B)
	OAC rule 3745-31-05(C) (to avoid being subject to OAC rules 3745-31-28 and Title V permitting requirements)	
	OAC rule 3745-17-07(A)(1)	

Applicable Emissions Limitations/Control Measures
The hydrochloric acid (HCl) emissions shall not exceed 0.001 pound per hour (lb/hr).
The hydrochloric acid (HCl) emissions shall not exceed 0.002 Tons per Year (TPY). See T&C A.2.c.
The requirements of this rule also include compliance with the requirements of OAC rule 3745-31-05(C) and OAC rule 3745-17-07(A)(1). See T&C A.2.b.
Visible particulate emissions from any stack associated with emissions unit P053 shall not exceed 20 percent opacity, as a six-minute average, except as specified by rule.
The emission limitation specified by this rule is less stringent than the emission limitation established pursuant to OAC rule 3745-31-05(A)(3).

2. Additional Terms and Conditions

2.a The hourly emission limitations outlined in term A.1. are based upon the emissions unit's potential to emit. Therefore, no hourly records are required to demonstrate compliance with these limits.

2.b The actual emissions of Hazardous Air Pollutants (HAPs), as identified in Section 112(b) of Title III of the Clean Air Act, from this facility shall not exceed 9.9 TPY for any single HAP and 24.9 TPY for any combination of HAPs. Compliance with the above limitations shall be based on a rolling, 12-month summation. The permittee has existing records to demonstrate compliance with these limits upon issuance of this permit.

2.c Compliance with OAC rule 3745-31-05(A)(3) shall be demonstrated by the use of a wet scrubber, compliance with the HCl emissions limits and compliance with the facility-wide HAPs emissions limits.

B. Operational Restrictions

1. The scrubber water recirculation flow rate shall be continuously maintained at a value of not less than 60 gallons per minute at all times while the emissions unit is in operation.

2. The pH of the scrubbing liquor shall be maintained within the range of 8-13 at all times while the emissions unit is in operation.

C. Monitoring and/or Recordkeeping Requirements

1. The permittee shall properly install, operate and maintain equipment to continuously monitor the scrubber water recirculation flow rate into the scrubber and the pH of the scrubber liquor while the emissions unit is in operation. The monitoring devices and any recorders shall be installed, calibrated, operated and maintained in accordance with the manufacturer's recommendations, instructions and operating manuals.

   The permittee shall collect and record the following information each day:

   a. the scrubber water recirculation flow rate, in gallons per minute, on a once per day basis;

   b. the pH of the scrubber liquor, on a once per day basis; and

   c. the operating times for the capture (collection) system, control device, monitoring equipment, and the associated emissions unit.

2. The permittee shall collect and record the following information each month for the entire facility:

   a. for all epitaxial reactors, the amount of hydrogen chloride (HCl) used (input), in pounds;

   b. for all epitaxial reactors, the amount of HCl released from the reaction of trichlorosilane,

in pounds;

c. for all epitaxial reactors, the amount of controlled emissions of each HAP, in tons;

d. for all emissions units, the amount of any other material used which contains HAPs, in tons;

e. for all emissions units, the individual HAP content for each HAP of each material used, in percent by weight (ton HAP/ton material);

f. the total individual HAP emissions for each HAP from all materials employed, in tons per month [for each HAP the sum of c. plus (d. times e.)];

g. the total combined HAP emissions from all materials employed, in tons per month (the sum of all HAPs as calculated in f.);

h. the updated rolling, 12-month summation of each individual HAP emissions, in pounds or tons. This shall include the information for the current month and the preceding eleven calender months ; and

i. the updated rolling, 12-month summation of total combined HAP emissions, in pounds or tons. This shall include the information for the current month and the preceding eleven calender months.

* A listing of the HAPs can be found in Section 112(b) of the Clean Air Act or can be obtained by contacting your Hamilton County Department of Environmental Services contact. This information does not have to be kept on a individual emissions unit basis.

3. The permit to install for emissions units P024 - P035 and P051 - P074 was evaluated based on the actual materials (typically coatings and cleanup materials) and the design parameters of the emissions unit's exhaust systems, as specified by the permittee in the permit to install application. The Ohio EPA's "Review of New Sources of Air Toxic Emissions" policy ("Air Toxic Policy") was applied for each pollutant emitted by this emissions unit using data from the permit to install application and the SCREEN 3.0 model (or other Ohio EPA approved model). The predicted 1-hour maximum ground-level concentration from the use of the SCREEN 3.0 model was compared to the Maximum Ground-Level Concentration (MAGLC).

The following summarizes the results of the modeling for the "worst case" pollutant(s):

Pollutant: HCl (CAS 7647-01-0)

TLV (ug/m^3): 2198

Maximum Hourly Emission Rate (lbs/hr): 0.132 lbs/hr HCl, P024 - P035 and P051 - P074, combined

Predicted 1-Hour Maximum Ground-Level Concentration (ug/m^3): 30.68 Ug/m^3, P024 - P035 and P051 - P074, combined

MAGLC (ug/m^3): 52.33

Physical changes to or in the method of operation of the emissions unit after it's installation or modification could affect the parameters used to determine whether or not the "Air Toxics Policy" is satisfied. Consequently, prior to making a change that could impact such parameters, the permittee shall conduct an evaluation to determine that the "Air Toxic Policy" will still be satisfied. If, upon evaluation, the permittee determines that the "Air Toxic Policy" will not be satisfied, the permittee will not make the change. Changes that can affect the parameters used in the "Air Toxic Policy" include the following:

a. changes in the composition of the materials used (typically for coatings or cleanup materials), or the use of new materials, that would result in the emission of a compound with a lower Threshold Limit Value (TLV), as indicated in the most recent version of the handbook entitled "American Conference of Governmental Industrial Hygienists (ACGIH)," than the lowest TLV value previously modeled;

b. changes in the composition of the materials, or use of new materials, that would result in an increase in emissions of any pollutant with a listed TLV that was proposed in the application and modeled; and

c. physical changes to the emissions unit or its exhaust parameters (e.g., increased/decreased exhaust flow, changes in stack height, changes in stack diameter, etc.).

If the permittee determines that the "Air Toxic Policy" will be satisfied for the above changes, the Ohio EPA will not consider the change(s) to be a "modification" under OAC rule 3745-31-01 solely due to the emissions of any type of toxic air contaminant not previously emitted, and a modification of the existing permit to install will not be required, even if the toxic air contaminant emissions are greater than the de minimis level in OAC rule 3745-15-05. If the change(s) is (are) defined as a modification under other provisions of the modification definition, then the permittee shall obtain a final permit to install prior to the change.

The permittee shall collect, record, and retain the following information when it conducts evaluations to determine that the changed emissions unit will satisfy the Air Toxic Policy:"

a. a description of the parameters changed(composition of materials, new pollutants emitted, change in stack/exhaust parameters, etc.);

b. documentation of it's evaluation and determination that the changed emissions unit still satisfies the "Air Toxic Policy"; and

c. when the computer modeling is performed, a copy of the resulting computer model runs that show the results of the application of the "Air Toxic Policy" for the change.

D. Reporting Requirements

1. The permittee shall submit quarterly deviation (excursion) reports to the Hamilton County Department of Environmental Services that identify all periods of time during which the following scrubber parameters were not maintained within the requirements of the Operational Restrictions:

   a. the scrubber water recirculation flow rate; and

   b. the scrubber solution pH.

   If no exceedances occurred during the reporting period then a report is required stating so. These reports shall be submitted by January 31, April 30, July 31, and October 31 of each year and shall cover the previous calendar quarters.

2. The permittee shall notify the Hamilton County Department of Environmental Services of any exceedance of the HAP emissions limitations set forth in term A.2.b. The reports shall be submitted to the Director (the Hamilton County Department of Environmental Services) by January 31, April 30, July 31 and October 31 of each year and shall cover the previous three calendar months (October through December, January through March, April through June and July through September, respectively.)

   If no exceedances occurred, the permittee shall state so in the report.

E. Testing Requirements

1. Emissions Limitations

   The hydrochloric acid (HCl) emissions shall not exceed 0.001 pound per hour (lb/hr)
   The hydrochloric acid (HCl) emissions shall not exceed 0.002 Tons per Year (TPY)

   Applicable Compliance Methods

Compliance with the hourly HCl emissions limitation shall be determined by the following calculations:

a. for the conversion of TCS to HCl in the scrubber:

actual trichlorosilane usage (lbs TCS/hr) x unit conversion trichlorosilane (1 mole TCS/135.4524 gMW TCS) x stoichiometric ratio (3 moles HCl/1 mole TCS) x unit conversion HCl (36.3609 gMW HCL/1 mole HCl) = lbs HCl/hr

b. for the addition of HCl in the hi-etch process:

actual cycle time (min/cycle) x actual production rate (cycles/hr) x actual flow rate (liters HCl/hr) x conversion factor (ft3/28.3168 liters) x conversion factor (1 lb HCl/9.7752 ft3 HCl) = lbs HCl/hr; and

c. (lbs HCl/hr from the conversion of TCS + lbs HCl/hr from the addition of HCl) x scrubber efficiency (1 - 99.5/100) = lbs HCl/hr from the scrubber stack

Compliance with the annual HCl emissions limitation shall be determined by the recordkeeping requirement in T&C C.2.h.

2. Emissions Limitation

Visible particulate emissions from any stack associated with emissions unit P053 shall not exceed 20 percent opacity, as a six-minute average, except as specified by rule

Applicable Compliance Method

Compliance shall be determined in accordance with Test Method 9 as set forth in "Appendix on Test Methods" in 40 CFR, Part 60 ("Standards of Performance for New Stationary Sources"), as such Appendix existed on July 1, 1996.

3. Emissions Limitations

9.9 TPY for any single HAP and 24.9 TPY for any combination of HAPs

Compliance with the HAPs emissions limits outlined in T&C A.2.b. shall be demonstrated by the recordkeeping requirements in T&C C.2.

4. Compliance with the operational restrictions for the wet scrubber in T&Cs B.1. and B.2. shall be demonstrated by the recordkeeping requirements in T&C C.1.

F. Miscellaneous Requirements

1. The following terms and conditions of this permit are federally enforceable: A, B, C.1, C.2, D and E.

PART II - SPECIAL TERMS AND CONDITIONS FOR SPECIFIC EMISSIONS UNIT(S)

A. Applicable Emissions Limitations and/or Control Requirements

1. The specific operations(s), property, and/or equipment which constitute this emissions unit are listed in the following table along with the applicable rules and/or requirements and with the applicable emissions limitations and/or control measures. Emissions from this unit shall not exceed the listed limitations, and the listed control measures shall be specified in narrative form following the table.

Operations, Property, and/or Equipment	Applicable Rules/Requirements	
P054 - B08 - AMT Barrel Reactor; CS-2 - Plant-wide condenser, scrubber, and hydrogen recovery unit	OAC rule 3745-31-05(A)(3)	OAC rule 3745-17-11(B)
	OAC rule 3745-31-05(C) (to avoid being subject to OAC rules 3745-31-28 and Title V permitting requirements)	
	OAC rule 3745-17-07(A)(1)	

Applicable Emissions Limitations/Control Measures
The hydrochloric acid (HCl) emissions shall not exceed 0.001 pound per hour (lb/hr).
The hydrochloric acid (HCl) emissions shall not exceed 0.002 Tons per Year (TPY).
See T&C A.2.c.
The requirements of this rule also include compliance with the requirements of OAC rule 3745-31-05(C) and OAC rule 3745-17-07(A)(1).
See T&C A.2.b.
Visible particulate emissions from any stack associated with emissions unit P054 shall not exceed 20 percent opacity, as a six-minute average, except as specified by rule.
The emission limitation specified by this rule is less stringent than the emission limitation established pursuant to OAC rule 3745-31-05(A)(3).

2. Additional Terms and Conditions

2.a The hourly emission limitations outlined in term A.1. are based upon the emissions unit's

potential to emit. Therefore, no hourly records are required to demonstrate compliance with these limits.

2.b The actual emissions of Hazardous Air Pollutants (HAPs), as identified in Section 112(b) of Title III of the Clean Air Act, from this facility shall not exceed 9.9 TPY for any single HAP and 24.9 TPY for any combination of HAPs. Compliance with the above limitations shall be based on a rolling, 12-month summation. The permittee has existing records to demonstrate compliance with these limits upon issuance of this permit.

2.c Compliance with OAC rule 3745-31-05(A)(3) shall be demonstrated by the use of a wet scrubber, compliance with the HCl emissions limits and compliance with the facility-wide HAPs emissions limits.

B. Operational Restrictions

1. The scrubber water recirculation flow rate shall be continuously maintained at a value of not less than 60 gallons per minute at all times while the emissions unit is in operation.

2. The pH of the scrubbing liquor shall be maintained within the range of 8-13 at all times while the emissions unit is in operation.

C. Monitoring and/or Recordkeeping Requirements

1. The permittee shall properly install, operate and maintain equipment to continuously monitor the scrubber water recirculation flow rate into the scrubber and the pH of the scrubber liquor while the emissions unit is in operation. The monitoring devices and any recorders shall be installed, calibrated, operated and maintained in accordance with the manufacturer's recommendations, instructions and operating manuals.

   The permittee shall collect and record the following information each day:

   a. the scrubber water recirculation flow rate, in gallons per minute, on a once per day basis;

   b. the pH of the scrubber liquor, on a once per day basis; and

   c. the operating times for the capture (collection) system, control device, monitoring equipment, and the associated emissions unit.

2. The permittee shall collect and record the following information each month for the entire facility:

   a. for all epitaxial reactors, the amount of hydrogen chloride (HCl) used (input), in pounds;

b. for all epitaxial reactors, the amount of HCl released from the reaction of trichlorosilane, in pounds;

c. for all epitaxial reactors, the amount of controlled emissions of each HAP, in tons;

d. for all emissions units, the amount of any other material used which contains HAPs, in tons;

e. for all emissions units, the individual HAP content for each HAP of each material used, in percent by weight (ton HAP/ton material);

f. the total individual HAP emissions for each HAP from all materials employed, in tons per month [for each HAP the sum of c. plus (d. times e.)];

g. the total combined HAP emissions from all materials employed, in tons per month (the sum of all HAPs as calculated in f.);

h. the updated rolling, 12-month summation of each individual HAP emissions, in pounds or tons. This shall include the information for the current month and the preceding eleven calender months ; and

i. the updated rolling, 12-month summation of total combined HAP emissions, in pounds or tons. This shall include the information for the current month and the preceding eleven calender months.

* A listing of the HAPs can be found in Section 112(b) of the Clean Air Act or can be obtained by contacting your Hamilton County Department of Environmental Services contact. This information does not have to be kept on a individual emissions unit basis.

3. The permit to install for emissions units P024 - P035 and P051 - P074 was evaluated based on the actual materials (typically coatings and cleanup materials) and the design parameters of the emissions unit's exhaust systems, as specified by the permittee in the permit to install application. The Ohio EPA's "Review of New Sources of Air Toxic Emissions" policy ("Air Toxic Policy") was applied for each pollutant emitted by this emissions unit using data from the permit to install application and the SCREEN 3.0 model (or other Ohio EPA approved model). The predicted 1-hour maximum ground-level concentration from the use of the SCREEN 3.0 model was compared to the Maximum Ground-Level Concentration (MAGLC).

The following summarizes the results of the modeling for the "worst case" pollutant(s):

Emissions Unit ID: **P054**

Pollutant: HCl (CAS 7647-01-0)

TLV (ug/m^3): 2198

Maximum Hourly Emission Rate (lbs/hr): 0.132 lbs/hr HCl, P024 - P035 and P051 - P074, combined

Predicted 1-Hour Maximum Ground-Level Concentration (ug/m^3): 30.68 Ug/m^3, P024 - P035 and P051 - P074, combined

MAGLC (ug/m^3): 52.33

Physical changes to or in the method of operation of the emissions unit after it's installation or modification could affect the parameters used to determine whether or not the "Air Toxics Policy" is satisfied. Consequently, prior to making a change that could impact such parameters, the permittee shall conduct an evaluation to determine that the "Air Toxic Policy" will still be satisfied. If, upon evaluation, the permittee determines that the "Air Toxic Policy" will not be satisfied, the permittee will not make the change. Changes that can affect the parameters used in the "Air Toxic Policy" include the following:

a. changes in the composition of the materials used (typically for coatings or cleanup materials), or the use of new materials, that would result in the emission of a compound with a lower Threshold Limit Value (TLV), as indicated in the most recent version of the handbook entitled "American Conference of Governmental Industrial Hygienists (ACGIH)," than the lowest TLV value previously modeled;

b. changes in the composition of the materials, or use of new materials, that would result in an increase in emissions of any pollutant with a listed TLV that was proposed in the application and modeled; and

c. physical changes to the emissions unit or its exhaust parameters (e.g., increased/decreased exhaust flow, changes in stack height, changes in stack diameter, etc.).

If the permittee determines that the "Air Toxic Policy" will be satisfied for the above changes, the Ohio EPA will not consider the change(s) to be a "modification" under OAC rule 3745-31-01 solely due to the emissions of any type of toxic air contaminant not previously emitted, and a modification of the existing permit to install will not be required, even if the toxic air contaminant emissions are greater than the de minimis level in OAC rule 3745-15-05. If the change(s) is (are) defined as a modification under other provisions of the modification definition, then the permittee shall obtain a final permit to install prior to the change.

The permittee shall collect, record, and retain the following information when it conducts

evaluations to determine that the changed emissions unit will satisfy the Air Toxic Policy:"

a. a description of the parameters changed(composition of materials, new pollutants emitted, change in stack/exhaust parameters, etc.);

b. documentation of it's evaluation and determination that the changed emissions unit still satisfies the "Air Toxic Policy"; and

c. when the computer modeling is performed, a copy of the resulting computer model runs that show the results of the application of the "Air Toxic Policy" for the change.

D. Reporting Requirements

1. The permittee shall submit quarterly deviation (excursion) reports to the Hamilton County Department of Environmental Services that identify all periods of time during which the following scrubber parameters were not maintained within the requirements of the Operational Restrictions:

   a. the scrubber water recirculation flow rate; and

   b. the scrubber solution pH.

   If no exceedances occurred during the reporting period then a report is required stating so. These reports shall be submitted by January 31, April 30, July 31, and October 31 of each year and shall cover the previous calendar quarters.

2. The permittee shall notify the Hamilton County Department of Environmental Services of any exceedance of the HAP emissions limitations set forth in term A.2.b. The reports shall be submitted to the Director (the Hamilton County Department of Environmental Services) by January 31, April 30, July 31 and October 31 of each year and shall cover the previous three calendar months (October through December, January through March, April through June and July through September, respectively.)

   If no exceedances occurred, the permittee shall state so in the report.

E. Testing Requirements

1. Emissions Limitations

   The hydrochloric acid (HCl) emissions shall not exceed 0.001 pound per hour (lb/hr)
   The hydrochloric acid (HCl) emissions shall not exceed 0.002 Tons per Year (TPY)

Applicable Compliance Methods

Compliance with the hourly HCl emissions limitation shall be determined by the following calculations:

a. for the conversion of TCS to HCl in the scrubber:

actual trichlorosilane usage (lbs TCS/hr) x unit conversion trichlorosilane (1 mole TCS/135.4524 gMW TCS) x stoichiometric ratio (3 moles HCl/1 mole TCS) x unit conversion HCl (36.3609 gMW HCL/1 mole HCl) = lbs HCl/hr

b. for the addition of HCl in the hi-etch process:

actual cycle time (min/cycle) x actual production rate (cycles/hr) x actual flow rate (liters HCl/hr) x conversion factor (ft3/28.3168 liters) x conversion factor (1 lb HCl/9.7752 ft3 HCl) = lbs HCl/hr; and

c. (lbs HCl/hr from the conversion of TCS + lbs HCl/hr from the addition of HCl) x scrubber efficiency (1 - 99.5/100) = lbs HCl/hr from the scrubber stack

Compliance with the annual HCl emissions limitation shall be determined by the recordkeeping requirement in T&C C.2.h.

2. Emissions Limitation

Visible particulate emissions from any stack associated with emissions unit P054 shall not exceed 20 percent opacity, as a six-minute average, except as specified by rule

Applicable Compliance Method

Compliance shall be determined in accordance with Test Method 9 as set forth in "Appendix on Test Methods" in 40 CFR, Part 60 ("Standards of Performance for New Stationary Sources"), as such Appendix existed on July 1, 1996.

3. Emissions Limitations

9.9 TPY for any single HAP and 24.9 TPY for any combination of HAPs

Compliance with the HAPs emissions limits outlined in T&C A.2.b. shall be demonstrated by the recordkeeping requirements in T&C C.2.

4. Compliance with the operational restrictions for the wet scrubber in T&Cs B.1. and B.2. shall be demonstrated by the recordkeeping requirements in T&C C.1.

F. Miscellaneous Requirements

1. The following terms and conditions of this permit are federally enforceable: A, B, C.1, C.2, D and E.

PART II - SPECIAL TERMS AND CONDITIONS FOR SPECIFIC EMISSIONS UNIT(S)

A. Applicable Emissions Limitations and/or Control Requirements

1. The specific operations(s), property, and/or equipment which constitute this emissions unit are listed in the following table along with the applicable rules and/or requirements and with the applicable emissions limitations and/or control measures. Emissions from this unit shall not exceed the listed limitations, and the listed control measures shall be specified in narrative form following the table.

Operations, Property, and/or Equipment	Applicable Rules/Requirements	
P055 - B09 - AMT Barrel Reactor; CS-2 - Plant-wide condenser, scrubber, and hydrogen recovery unit	OAC rule 3745-31-05(A)(3)	OAC rule 3745-17-11(B)
	OAC rule 3745-31-05(C) (to avoid being subject to OAC rules 3745-31-28 and Title V permitting requirements)	
	OAC rule 3745-17-07(A)(1)	

Applicable Emissions Limitations/Control Measures	
The hydrochloric acid (HCl) emissions shall not exceed 0.001 pound per hour (lb/hr).	
The hydrochloric acid (HCl) emissions shall not exceed 0.002 Tons per Year (TPY).	See T&C A.2.c.
The requirements of this rule also include compliance with the requirements of OAC rule 3745-31-05(C) and OAC rule 3745-17-07(A)(1).	See T&C A.2.b.
Visible particulate emissions from any stack associated with emissions unit P055 shall not exceed 20 percent opacity, as a six-minute average, except as specified by rule.	
The emission limitation specified by this rule is less stringent than the emission limitation established pursuant to OAC rule 3745-31-05(A)(3).	

2. Additional Terms and Conditions

2.a The hourly emission limitations outlined in term A.1. are based upon the emissions unit's potential to emit. Therefore, no hourly records are required to demonstrate compliance

with these limits.

2.b The actual emissions of Hazardous Air Pollutants (HAPs), as identified in Section 112(b) of Title III of the Clean Air Act, from this facility shall not exceed 9.9 TPY for any single HAP and 24.9 TPY for any combination of HAPs. Compliance with the above limitations shall be based on a rolling, 12-month summation. The permittee has existing records to demonstrate compliance with these limits upon issuance of this permit.

2.c Compliance with OAC rule 3745-31-05(A)(3) shall be demonstrated by the use of a wet scrubber, compliance with the HCl emissions limits and compliance with the facility-wide HAPs emissions limits.

B. Operational Restrictions

1. The scrubber water recirculation flow rate shall be continuously maintained at a value of not less than 60 gallons per minute at all times while the emissions unit is in operation.

2. The pH of the scrubbing liquor shall be maintained within the range of 8-13 at all times while the emissions unit is in operation.

C. Monitoring and/or Recordkeeping Requirements

1. The permittee shall properly install, operate and maintain equipment to continuously monitor the scrubber water recirculation flow rate into the scrubber and the pH of the scrubber liquor while the emissions unit is in operation. The monitoring devices and any recorders shall be installed, calibrated, operated and maintained in accordance with the manufacturer's recommendations, instructions and operating manuals.

   The permittee shall collect and record the following information each day:

   a. the scrubber water recirculation flow rate, in gallons per minute, on a once per day basis;

   b. the pH of the scrubber liquor, on a once per day basis; and

   c. the operating times for the capture (collection) system, control device, monitoring equipment, and the associated emissions unit.

2. The permittee shall collect and record the following information each month for the entire facility:

   a. for all epitaxial reactors, the amount of hydrogen chloride (HCl) used (input), in pounds;

   b. for all epitaxial reactors, the amount of HCl released from the reaction of trichlorosilane,

in pounds;

c. for all epitaxial reactors, the amount of controlled emissions of each HAP, in tons;

d. for all emissions units, the amount of any other material used which contains HAPs, in tons;

e. for all emissions units, the individual HAP content for each HAP of each material used, in percent by weight (ton HAP/ton material);

f. the total individual HAP emissions for each HAP from all materials employed, in tons per month [for each HAP the sum of c. plus (d. times e.)];

g. the total combined HAP emissions from all materials employed, in tons per month (the sum of all HAPs as calculated in f.);

h. the updated rolling, 12-month summation of each individual HAP emissions, in pounds or tons. This shall include the information for the current month and the preceding eleven calender months ; and

i. the updated rolling, 12-month summation of total combined HAP emissions, in pounds or tons. This shall include the information for the current month and the preceding eleven calender months.

* A listing of the HAPs can be found in Section 112(b) of the Clean Air Act or can be obtained by contacting your Hamilton County Department of Environmental Services contact. This information does not have to be kept on a individual emissions unit basis.

3. The permit to install for emissions units P024 - P035 and P051 - P074 was evaluated based on the actual materials (typically coatings and cleanup materials) and the design parameters of the emissions unit's exhaust systems, as specified by the permittee in the permit to install application. The Ohio EPA's "Review of New Sources of Air Toxic Emissions" policy ("Air Toxic Policy") was applied for each pollutant emitted by this emissions unit using data from the permit to install application and the SCREEN 3.0 model (or other Ohio EPA approved model). The predicted 1-hour maximum ground-level concentration from the use of the SCREEN 3.0 model was compared to the Maximum Ground-Level Concentration (MAGLC).

The following summarizes the results of the modeling for the "worst case" pollutant(s):

Pollutant: HCl (CAS 7647-01-0)

TLV (ug/m^3): 2198

Maximum Hourly Emission Rate (lbs/hr): 0.132 lbs/hr HCl, P024 - P035 and P051 - P074, combined

Predicted 1-Hour Maximum Ground-Level Concentration (ug/m^3): 30.68 Ug/m^3, P024 - P035 and P051 - P074, combined

MAGLC (ug/m^3): 52.33

Physical changes to or in the method of operation of the emissions unit after it's installation or modification could affect the parameters used to determine whether or not the "Air Toxics Policy" is satisfied. Consequently, prior to making a change that could impact such parameters, the permittee shall conduct an evaluation to determine that the "Air Toxic Policy" will still be satisfied. If, upon evaluation, the permittee determines that the "Air Toxic Policy" will not be satisfied, the permittee will not make the change. Changes that can affect the parameters used in the "Air Toxic Policy" include the following:

a. changes in the composition of the materials used (typically for coatings or cleanup materials), or the use of new materials, that would result in the emission of a compound with a lower Threshold Limit Value (TLV), as indicated in the most recent version of the handbook entitled "American Conference of Governmental Industrial Hygienists (ACGIH)," than the lowest TLV value previously modeled;

b. changes in the composition of the materials, or use of new materials, that would result in an increase in emissions of any pollutant with a listed TLV that was proposed in the application and modeled; and

c. physical changes to the emissions unit or its exhaust parameters (e.g., increased/decreased exhaust flow, changes in stack height, changes in stack diameter, etc.).

If the permittee determines that the "Air Toxic Policy" will be satisfied for the above changes, the Ohio EPA will not consider the change(s) to be a "modification" under OAC rule 3745-31-01 solely due to the emissions of any type of toxic air contaminant not previously emitted, and a modification of the existing permit to install will not be required, even if the toxic air contaminant emissions are greater than the de minimis level in OAC rule 3745-15-05. If the change(s) is (are) defined as a modification under other provisions of the modification definition, then the permittee shall obtain a final permit to install prior to the change.

The permittee shall collect, record, and retain the following information when it conducts evaluations to determine that the changed emissions unit will satisfy the Air Toxic Policy:"

a. a description of the parameters changed(composition of materials, new pollutants emitted, change in stack/exhaust parameters, etc.);

b. documentation of it's evaluation and determination that the changed emissions unit still satisfies the "Air Toxic Policy"; and

c. when the computer modeling is performed, a copy of the resulting computer model runs that show the results of the application of the "Air Toxic Policy" for the change.

D. Reporting Requirements

1. The permittee shall submit quarterly deviation (excursion) reports to the Hamilton County Department of Environmental Services that identify all periods of time during which the following scrubber parameters were not maintained within the requirements of the Operational Restrictions:

   a. the scrubber water recirculation flow rate; and

   b. the scrubber solution pH.

   If no exceedances occurred during the reporting period then a report is required stating so. These reports shall be submitted by January 31, April 30, July 31, and October 31 of each year and shall cover the previous calendar quarters.

2. The permittee shall notify the Hamilton County Department of Environmental Services of any exceedance of the HAP emissions limitations set forth in term A.2.b. The reports shall be submitted to the Director (the Hamilton County Department of Environmental Services) by January 31, April 30, July 31 and October 31 of each year and shall cover the previous three calendar months (October through December, January through March, April through June and July through September, respectively.)

   If no exceedances occurred, the permittee shall state so in the report.

E. Testing Requirements

1. Emissions Limitations

   The hydrochloric acid (HCl) emissions shall not exceed 0.001 pound per hour (lb/hr)
   The hydrochloric acid (HCl) emissions shall not exceed 0.002 Tons per Year (TPY)

   Applicable Compliance Methods

Compliance with the hourly HCl emissions limitation shall be determined by the following calculations:

a. for the conversion of TCS to HCl in the scrubber:

actual trichlorosilane usage (lbs TCS/hr) x unit conversion trichlorosilane (1 mole TCS/135.4524 gMW TCS) x stoichiometric ratio (3 moles HCl/1 mole TCS) x unit conversion HCl (36.3609 gMW HCL/1 mole HCl) = lbs HCl/hr

b. for the addition of HCl in the hi-etch process:

actual cycle time (min/cycle) x actual production rate (cycles/hr) x actual flow rate (liters HCl/hr) x conversion factor (ft3/28.3168 liters) x conversion factor (1 lb HCl/9.7752 ft3 HCl) = lbs HCl/hr; and

c. (lbs HCl/hr from the conversion of TCS + lbs HCl/hr from the addition of HCl) x scrubber efficiency (1 - 99.5/100) = lbs HCl/hr from the scrubber stack

Compliance with the annual HCl emissions limitation shall be determined by the recordkeeping requirement in T&C C.2.h.

2. Emissions Limitation

Visible particulate emissions from any stack associated with emissions unit P055 shall not exceed 20 percent opacity, as a six-minute average, except as specified by rule

Applicable Compliance Method

Compliance shall be determined in accordance with Test Method 9 as set forth in "Appendix on Test Methods" in 40 CFR, Part 60 ("Standards of Performance for New Stationary Sources"), as such Appendix existed on July 1, 1996.

3. Emissions Limitations

9.9 TPY for any single HAP and 24.9 TPY for any combination of HAPs

Compliance with the HAPs emissions limits outlined in T&C A.2.b. shall be demonstrated by the recordkeeping requirements in T&C C.2.

4. Compliance with the operational restrictions for the wet scrubber in T&Cs B.1. and B.2. shall be demonstrated by the recordkeeping requirements in T&C C.1.

F. Miscellaneous Requirements

1. The following terms and conditions of this permit are federally enforceable: A, B, C.1, C.2, D and E.

PART II - SPECIAL TERMS AND CONDITIONS FOR SPECIFIC EMISSIONS UNIT(S)

A. Applicable Emissions Limitations and/or Control Requirements

1. The specific operations(s), property, and/or equipment which constitute this emissions unit are listed in the following table along with the applicable rules and/or requirements and with the applicable emissions limitations and/or control measures. Emissions from this unit shall not exceed the listed limitations, and the listed control measures shall be specified in narrative form following the table.

Operations, Property, and/or Equipment	Applicable Rules/Requirements	
P056 - B10 - AMT Barrel Reactor; CS-2 - Plant-wide condenser, scrubber, and hydrogen recovery unit	OAC rule 3745-31-05(A)(3)	OAC rule 3745-17-11(B)
	OAC rule 3745-31-05(C) (to avoid being subject to OAC rules 3745-31-28 and Title V permitting requirements)	
	OAC rule 3745-17-07(A)(1)	

Applicable Emissions Limitations/Control Measures	
The hydrochloric acid (HCl) emissions shall not exceed 0.001 pound per hour (lb/hr).	
The hydrochloric acid (HCl) emissions shall not exceed 0.002 Tons per Year (TPY).	See T&C A.2.c.
The requirements of this rule also include compliance with the requirements of OAC rule 3745-31-05(C) and OAC rule 3745-17-07(A)(1).	See T&C A.2.b.
Visible particulate emissions from any stack associated with emissions unit P056 shall not exceed 20 percent opacity, as a six-minute average, except as specified by rule.	
The emission limitation specified by this rule is less stringent than the emission limitation established pursuant to OAC rule 3745-31-05(A)(3).	

2. Additional Terms and Conditions

2.a The hourly emission limitations outlined in term A.1. are based upon the emissions unit's potential to emit. Therefore, no hourly records are required to demonstrate compliance

with these limits.

2.b The actual emissions of Hazardous Air Pollutants (HAPs), as identified in Section 112(b) of Title III of the Clean Air Act, from this facility shall not exceed 9.9 TPY for any single HAP and 24.9 TPY for any combination of HAPs. Compliance with the above limitations shall be based on a rolling, 12-month summation. The permittee has existing records to demonstrate compliance with these limits upon issuance of this permit.

2.c Compliance with OAC rule 3745-31-05(A)(3) shall be demonstrated by the use of a wet scrubber, compliance with the HCl emissions limits and compliance with the facility-wide HAPs emissions limits.

B. Operational Restrictions

1. The scrubber water recirculation flow rate shall be continuously maintained at a value of not less than 60 gallons per minute at all times while the emissions unit is in operation.

2. The pH of the scrubbing liquor shall be maintained within the range of 8-13 at all times while the emissions unit is in operation.

C. Monitoring and/or Recordkeeping Requirements

1. The permittee shall properly install, operate and maintain equipment to continuously monitor the scrubber water recirculation flow rate into the scrubber and the pH of the scrubber liquor while the emissions unit is in operation. The monitoring devices and any recorders shall be installed, calibrated, operated and maintained in accordance with the manufacturer's recommendations, instructions and operating manuals.

   The permittee shall collect and record the following information each day:

   a. the scrubber water recirculation flow rate, in gallons per minute, on a once per day basis;

   b. the pH of the scrubber liquor, on a once per day basis; and

   c. the operating times for the capture (collection) system, control device, monitoring equipment, and the associated emissions unit.

2. The permittee shall collect and record the following information each month for the entire facility:

   a. for all epitaxial reactors, the amount of hydrogen chloride (HCl) used (input), in pounds;

   b. for all epitaxial reactors, the amount of HCl released from the reaction of trichlorosilane,

in pounds;

c. for all epitaxial reactors, the amount of controlled emissions of each HAP, in tons;

d. for all emissions units, the amount of any other material used which contains HAPs, in tons;

e. for all emissions units, the individual HAP content for each HAP of each material used, in percent by weight (ton HAP/ton material);

f. the total individual HAP emissions for each HAP from all materials employed, in tons per month [for each HAP the sum of c. plus (d. times e.)];

g. the total combined HAP emissions from all materials employed, in tons per month (the sum of all HAPs as calculated in f.);

h. the updated rolling, 12-month summation of each individual HAP emissions, in pounds or tons. This shall include the information for the current month and the preceding eleven calender months ; and

i. the updated rolling, 12-month summation of total combined HAP emissions, in pounds or tons. This shall include the information for the current month and the preceding eleven calender months.

* A listing of the HAPs can be found in Section 112(b) of the Clean Air Act or can be obtained by contacting your Hamilton County Department of Environmental Services contact. This information does not have to be kept on a individual emissions unit basis.

3. The permit to install for emissions units P024 - P035 and P051 - P074 was evaluated based on the actual materials (typically coatings and cleanup materials) and the design parameters of the emissions unit's exhaust systems, as specified by the permittee in the permit to install application. The Ohio EPA's "Review of New Sources of Air Toxic Emissions" policy ("Air Toxic Policy") was applied for each pollutant emitted by this emissions unit using data from the permit to install application and the SCREEN 3.0 model (or other Ohio EPA approved model). The predicted 1-hour maximum ground-level concentration from the use of the SCREEN 3.0 model was compared to the Maximum Ground-Level Concentration (MAGLC).

The following summarizes the results of the modeling for the "worst case" pollutant(s):

Pollutant: HCl (CAS 7647-01-0)

TLV (ug/m^3): 2198

Maximum Hourly Emission Rate (lbs/hr): 0.132 lbs/hr HCl, P024 - P035 and P051 - P074, combined

Predicted 1-Hour Maximum Ground-Level Concentration (ug/m^3): 30.68 Ug/m^3, P024 - P035 and P051 - P074, combined

MAGLC (ug/m^3): 52.33

Physical changes to or in the method of operation of the emissions unit after it's installation or modification could affect the parameters used to determine whether or not the "Air Toxics Policy" is satisfied. Consequently, prior to making a change that could impact such parameters, the permittee shall conduct an evaluation to determine that the "Air Toxic Policy" will still be satisfied. If, upon evaluation, the permittee determines that the "Air Toxic Policy" will not be satisfied, the permittee will not make the change. Changes that can affect the parameters used in the "Air Toxic Policy" include the following:

a. changes in the composition of the materials used (typically for coatings or cleanup materials), or the use of new materials, that would result in the emission of a compound with a lower Threshold Limit Value (TLV), as indicated in the most recent version of the handbook entitled "American Conference of Governmental Industrial Hygienists (ACGIH)," than the lowest TLV value previously modeled;

b. changes in the composition of the materials, or use of new materials, that would result in an increase in emissions of any pollutant with a listed TLV that was proposed in the application and modeled; and

c. physical changes to the emissions unit or its exhaust parameters (e.g., increased/decreased exhaust flow, changes in stack height, changes in stack diameter, etc.).

If the permittee determines that the "Air Toxic Policy" will be satisfied for the above changes, the Ohio EPA will not consider the change(s) to be a "modification" under OAC rule 3745-31-01 solely due to the emissions of any type of toxic air contaminant not previously emitted, and a modification of the existing permit to install will not be required, even if the toxic air contaminant emissions are greater than the de minimis level in OAC rule 3745-15-05. If the change(s) is (are) defined as a modification under other provisions of the modification definition, then the permittee shall obtain a final permit to install prior to the change.

The permittee shall collect, record, and retain the following information when it conducts evaluations to determine that the changed emissions unit will satisfy the Air Toxic Policy:"

a. a description of the parameters changed(composition of materials, new pollutants emitted, change in stack/exhaust parameters, etc.);

b. documentation of it's evaluation and determination that the changed emissions unit still satisfies the "Air Toxic Policy"; and

c. when the computer modeling is performed, a copy of the resulting computer model runs that show the results of the application of the "Air Toxic Policy" for the change.

D. Reporting Requirements

1. The permittee shall submit quarterly deviation (excursion) reports to the Hamilton County Department of Environmental Services that identify all periods of time during which the following scrubber parameters were not maintained within the requirements of the Operational Restrictions:

   a. the scrubber water recirculation flow rate; and

   b. the scrubber solution pH.

   If no exceedances occurred during the reporting period then a report is required stating so. These reports shall be submitted by January 31, April 30, July 31, and October 31 of each year and shall cover the previous calendar quarters.

2. The permittee shall notify the Hamilton County Department of Environmental Services of any exceedance of the HAP emissions limitations set forth in term A.2.b. The reports shall be submitted to the Director (the Hamilton County Department of Environmental Services) by January 31, April 30, July 31 and October 31 of each year and shall cover the previous three calendar months (October through December, January through March, April through June and July through September, respectively.)

   If no exceedances occurred, the permittee shall state so in the report.

E. Testing Requirements

1. Emissions Limitations

   The hydrochloric acid (HCl) emissions shall not exceed 0.001 pound per hour (lb/hr)
   The hydrochloric acid (HCl) emissions shall not exceed 0.002 Tons per Year (TPY)

   Applicable Compliance Methods

Compliance with the hourly HCl emissions limitation shall be determined by the following calculations:

a. for the conversion of TCS to HCl in the scrubber:

actual trichlorosilane usage (lbs TCS/hr) x unit conversion trichlorosilane (1 mole TCS/135.4524 gMW TCS) x stoichiometric ratio (3 moles HCl/1 mole TCS) x unit conversion HCl (36.3609 gMW HCL/1 mole HCl) = lbs HCl/hr

b. for the addition of HCl in the hi-etch process:

actual cycle time (min/cycle) x actual production rate (cycles/hr) x actual flow rate (liters HCl/hr) x conversion factor (ft3/28.3168 liters) x conversion factor (1 lb HCl/9.7752 ft3 HCl) = lbs HCl/hr; and

c. (lbs HCl/hr from the conversion of TCS + lbs HCl/hr from the addition of HCl) x scrubber efficiency (1 - 99.5/100) = lbs HCl/hr from the scrubber stack

Compliance with the annual HCl emissions limitation shall be determined by the recordkeeping requirement in T&C C.2.h.

2. Emissions Limitation

Visible particulate emissions from any stack associated with emissions unit P056 shall not exceed 20 percent opacity, as a six-minute average, except as specified by rule

Applicable Compliance Method

Compliance shall be determined in accordance with Test Method 9 as set forth in "Appendix on Test Methods" in 40 CFR, Part 60 ("Standards of Performance for New Stationary Sources"), as such Appendix existed on July 1, 1996.

3. Emissions Limitations

9.9 TPY for any single HAP and 24.9 TPY for any combination of HAPs

Compliance with the HAPs emissions limits outlined in T&C A.2.b. shall be demonstrated by the recordkeeping requirements in T&C C.2.

4. Compliance with the operational restrictions for the wet scrubber in T&Cs B.1. and B.2. shall be demonstrated by the recordkeeping requirements in T&C C.1.

F. Miscellaneous Requirements

1. The following terms and conditions of this permit are federally enforceable: A, B, C.1, C.2, D and E.

PART II - SPECIAL TERMS AND CONDITIONS FOR SPECIFIC EMISSIONS UNIT(S)

A. Applicable Emissions Limitations and/or Control Requirements

1. The specific operations(s), property, and/or equipment which constitute this emissions unit are listed in the following table along with the applicable rules and/or requirements and with the applicable emissions limitations and/or control measures. Emissions from this unit shall not exceed the listed limitations, and the listed control measures shall be specified in narrative form following the table.

Operations, Property, and/or Equipment	Applicable Rules/Requirements	
P057 - B11 - AMT Barrel Reactor; CS-2 - Plant-wide condenser, scrubber, and hydrogen recovery unit	OAC rule 3745-31-05(A)(3)	OAC rule 3745-17-11(B)
	OAC rule 3745-31-05(C) (to avoid being subject to OAC rules 3745-31-28 and Title V permitting requirements)	
	OAC rule 3745-17-07(A)(1)	

Applicable Emissions Limitations/Control Measures
The hydrochloric acid (HCl) emissions shall not exceed 0.001 pound per hour (lb/hr).
The hydrochloric acid (HCl) emissions shall not exceed 0.002 Tons per Year (TPY). See T&C A.2.c.
The requirements of this rule also include compliance with the requirements of OAC rule 3745-31-05(C) and OAC rule 3745-17-07(A)(1). See T&C A.2.b.
Visible particulate emissions from any stack associated with emissions unit P057 shall not exceed 20 percent opacity, as a six-minute average, except as specified by rule.
The emission limitation specified by this rule is less stringent than the emission limitation established pursuant to OAC rule 3745-31-05(A)(3).

2. Additional Terms and Conditions

2.a The hourly emission limitations outlined in term A.1. are based upon the emissions unit's potential to emit. Therefore, no hourly records are required to demonstrate compliance

with these limits.

2.b The actual emissions of Hazardous Air Pollutants (HAPs), as identified in Section 112(b) of Title III of the Clean Air Act, from this facility shall not exceed 9.9 TPY for any single HAP and 24.9 TPY for any combination of HAPs. Compliance with the above limitations shall be based on a rolling, 12-month summation. The permittee has existing records to demonstrate compliance with these limits upon issuance of this permit.

2.c Compliance with OAC rule 3745-31-05(A)(3) shall be demonstrated by the use of a wet scrubber, compliance with the HCl emissions limits and compliance with the facility-wide HAPs emissions limits.

B. Operational Restrictions

1. The scrubber water recirculation flow rate shall be continuously maintained at a value of not less than 60 gallons per minute at all times while the emissions unit is in operation.

2. The pH of the scrubbing liquor shall be maintained within the range of 8-13 at all times while the emissions unit is in operation.

C. Monitoring and/or Recordkeeping Requirements

1. The permittee shall properly install, operate and maintain equipment to continuously monitor the scrubber water recirculation flow rate into the scrubber and the pH of the scrubber liquor while the emissions unit is in operation. The monitoring devices and any recorders shall be installed, calibrated, operated and maintained in accordance with the manufacturer's recommendations, instructions and operating manuals.

   The permittee shall collect and record the following information each day:

   a. the scrubber water recirculation flow rate, in gallons per minute, on a once per day basis;

   b. the pH of the scrubber liquor, on a once per day basis; and

   c. the operating times for the capture (collection) system, control device, monitoring equipment, and the associated emissions unit.

2. The permittee shall collect and record the following information each month for the entire facility:

   a. for all epitaxial reactors, the amount of hydrogen chloride (HCl) used (input), in pounds;

   b. for all epitaxial reactors, the amount of HCl released from the reaction of trichlorosilane,

in pounds;

c. for all epitaxial reactors, the amount of controlled emissions of each HAP, in tons;

d. for all emissions units, the amount of any other material used which contains HAPs, in tons;

e. for all emissions units, the individual HAP content for each HAP of each material used, in percent by weight (ton HAP/ton material);

f. the total individual HAP emissions for each HAP from all materials employed, in tons per month [for each HAP the sum of c. plus (d. times e.)];

g. the total combined HAP emissions from all materials employed, in tons per month (the sum of all HAPs as calculated in f.);

h. the updated rolling, 12-month summation of each individual HAP emissions, in pounds or tons. This shall include the information for the current month and the preceding eleven calender months ; and

i. the updated rolling, 12-month summation of total combined HAP emissions, in pounds or tons. This shall include the information for the current month and the preceding eleven calender months.

* A listing of the HAPs can be found in Section 112(b) of the Clean Air Act or can be obtained by contacting your Hamilton County Department of Environmental Services contact. This information does not have to be kept on a individual emissions unit basis.

3. The permit to install for emissions units P024 - P035 and P051 - P074 was evaluated based on the actual materials (typically coatings and cleanup materials) and the design parameters of the emissions unit's exhaust systems, as specified by the permittee in the permit to install application. The Ohio EPA's "Review of New Sources of Air Toxic Emissions" policy ("Air Toxic Policy") was applied for each pollutant emitted by this emissions unit using data from the permit to install application and the SCREEN 3.0 model (or other Ohio EPA approved model). The predicted 1-hour maximum ground-level concentration from the use of the SCREEN 3.0 model was compared to the Maximum Ground-Level Concentration (MAGLC).

The following summarizes the results of the modeling for the "worst case" pollutant(s):

Pollutant: HCl (CAS 7647-01-0)

TLV (ug/m^3): 2198

Maximum Hourly Emission Rate (lbs/hr): 0.132 lbs/hr HCl, P024 - P035 and P051 - P074, combined

Predicted 1-Hour Maximum Ground-Level Concentration (ug/m^3): 30.68 Ug/m^3, P024 - P035 and P051 - P074, combined

MAGLC (ug/m^3): 52.33

Physical changes to or in the method of operation of the emissions unit after it's installation or modification could affect the parameters used to determine whether or not the "Air Toxics Policy" is satisfied. Consequently, prior to making a change that could impact such parameters, the permittee shall conduct an evaluation to determine that the "Air Toxic Policy" will still be satisfied. If, upon evaluation, the permittee determines that the "Air Toxic Policy" will not be satisfied, the permittee will not make the change. Changes that can affect the parameters used in the "Air Toxic Policy" include the following:

a. changes in the composition of the materials used (typically for coatings or cleanup materials), or the use of new materials, that would result in the emission of a compound with a lower Threshold Limit Value (TLV), as indicated in the most recent version of the handbook entitled "American Conference of Governmental Industrial Hygienists (ACGIH)," than the lowest TLV value previously modeled;

b. changes in the composition of the materials, or use of new materials, that would result in an increase in emissions of any pollutant with a listed TLV that was proposed in the application and modeled; and

c. physical changes to the emissions unit or its exhaust parameters (e.g., increased/decreased exhaust flow, changes in stack height, changes in stack diameter, etc.).

If the permittee determines that the "Air Toxic Policy" will be satisfied for the above changes, the Ohio EPA will not consider the change(s) to be a "modification" under OAC rule 3745-31-01 solely due to the emissions of any type of toxic air contaminant not previously emitted, and a modification of the existing permit to install will not be required, even if the toxic air contaminant emissions are greater than the de minimis level in OAC rule 3745-15-05. If the change(s) is (are) defined as a modification under other provisions of the modification definition, then the permittee shall obtain a final permit to install prior to the change.

The permittee shall collect, record, and retain the following information when it conducts evaluations to determine that the changed emissions unit will satisfy the Air Toxic Policy:"

a. a description of the parameters changed(composition of materials, new pollutants emitted, change in stack/exhaust parameters, etc.);

b. documentation of it's evaluation and determination that the changed emissions unit still satisfies the "Air Toxic Policy"; and

c. when the computer modeling is performed, a copy of the resulting computer model runs that show the results of the application of the "Air Toxic Policy" for the change.

D. Reporting Requirements

1. The permittee shall submit quarterly deviation (excursion) reports to the Hamilton County Department of Environmental Services that identify all periods of time during which the following scrubber parameters were not maintained within the requirements of the Operational Restrictions:

   a. the scrubber water recirculation flow rate; and

   b. the scrubber solution pH.

   If no exceedances occurred during the reporting period then a report is required stating so. These reports shall be submitted by January 31, April 30, July 31, and October 31 of each year and shall cover the previous calendar quarters.

2. The permittee shall notify the Hamilton County Department of Environmental Services of any exceedance of the HAP emissions limitations set forth in term A.2.b. The reports shall be submitted to the Director (the Hamilton County Department of Environmental Services) by January 31, April 30, July 31 and October 31 of each year and shall cover the previous three calendar months (October through December, January through March, April through June and July through September, respectively.)

   If no exceedances occurred, the permittee shall state so in the report.

E. Testing Requirements

1. Emissions Limitations

   The hydrochloric acid (HCl) emissions shall not exceed 0.001 pound per hour (lb/hr)
   The hydrochloric acid (HCl) emissions shall not exceed 0.002 Tons per Year (TPY)

   Applicable Compliance Methods

Compliance with the hourly HCl emissions limitation shall be determined by the following calculations:

a. for the conversion of TCS to HCl in the scrubber:

actual trichlorosilane usage (lbs TCS/hr) x unit conversion trichlorosilane (1 mole TCS/135.4524 gMW TCS) x stoichiometric ratio (3 moles HCl/1 mole TCS) x unit conversion HCl (36.3609 gMW HCL/1 mole HCl) = lbs HCl/hr

b. for the addition of HCl in the hi-etch process:

actual cycle time (min/cycle) x actual production rate (cycles/hr) x actual flow rate (liters HCl/hr) x conversion factor (ft3/28.3168 liters) x conversion factor (1 lb HCl/9.7752 ft3 HCl) = lbs HCl/hr; and

c. (lbs HCl/hr from the conversion of TCS + lbs HCl/hr from the addition of HCl) x scrubber efficiency (1 - 99.5/100) = lbs HCl/hr from the scrubber stack

Compliance with the annual HCl emissions limitation shall be determined by the recordkeeping requirement in T&C C.2.h.

2. Emissions Limitation

Visible particulate emissions from any stack associated with emissions unit P057 shall not exceed 20 percent opacity, as a six-minute average, except as specified by rule

Applicable Compliance Method

Compliance shall be determined in accordance with Test Method 9 as set forth in "Appendix on Test Methods" in 40 CFR, Part 60 ("Standards of Performance for New Stationary Sources"), as such Appendix existed on July 1, 1996.

3. Emissions Limitations

9.9 TPY for any single HAP and 24.9 TPY for any combination of HAPs

Compliance with the HAPs emissions limits outlined in T&C A.2.b. shall be demonstrated by the recordkeeping requirements in T&C C.2.

4. Compliance with the operational restrictions for the wet scrubber in T&Cs B.1. and B.2. shall be demonstrated by the recordkeeping requirements in T&C C.1.

F. Miscellaneous Requirements

1. The following terms and conditions of this permit are federally enforceable: A, B, C.1, C.2, D and E.

PART II - SPECIAL TERMS AND CONDITIONS FOR SPECIFIC EMISSIONS UNIT(S)

A. Applicable Emissions Limitations and/or Control Requirements

1. The specific operations(s), property, and/or equipment which constitute this emissions unit are listed in the following table along with the applicable rules and/or requirements and with the applicable emissions limitations and/or control measures. Emissions from this unit shall not exceed the listed limitations, and the listed control measures shall be specified in narrative form following the table.

Operations, Property, and/or Equipment	Applicable Rules/Requirements	
P058 - B12 - AMT Barrel Reactor; CS-2 - Plant-wide condenser, scrubber, and hydrogen recovery unit	OAC rule 3745-31-05(A)(3)	OAC rule 3745-17-11(B)
	OAC rule 3745-31-05(C) (to avoid being subject to OAC rules 3745-31-28 and Title V permitting requirements)	
	OAC rule 3745-17-07(A)(1)	

Applicable Emissions Limitations/Control Measures	
The hydrochloric acid (HCl) emissions shall not exceed 0.001 pound per hour (lb/hr).	
The hydrochloric acid (HCl) emissions shall not exceed 0.002 Tons per Year (TPY).	See T&C A.2.c.
The requirements of this rule also include compliance with the requirements of OAC rule 3745-31-05(C) and OAC rule 3745-17-07(A)(1).	See T&C A.2.b.
Visible particulate emissions from any stack associated with emissions unit P058 shall not exceed 20 percent opacity, as a six-minute average, except as specified by rule.	
The emission limitation specified by this rule is less stringent than the emission limitation established pursuant to OAC rule 3745-31-05(A)(3).	

2. Additional Terms and Conditions

2.a The hourly emission limitations outlined in term A.1. are based upon the emissions unit's potential to emit. Therefore, no hourly records are required to demonstrate compliance

with these limits.

2.b The actual emissions of Hazardous Air Pollutants (HAPs), as identified in Section 112(b) of Title III of the Clean Air Act, from this facility shall not exceed 9.9 TPY for any single HAP and 24.9 TPY for any combination of HAPs. Compliance with the above limitations shall be based on a rolling, 12-month summation. The permittee has existing records to demonstrate compliance with these limits upon issuance of this permit.

2.c Compliance with OAC rule 3745-31-05(A)(3) shall be demonstrated by the use of a wet scrubber, compliance with the HCl emissions limits and compliance with the facility-wide HAPs emissions limits.

B. Operational Restrictions

1. The scrubber water recirculation flow rate shall be continuously maintained at a value of not less than 60 gallons per minute at all times while the emissions unit is in operation.

2. The pH of the scrubbing liquor shall be maintained within the range of 8-13 at all times while the emissions unit is in operation.

C. Monitoring and/or Recordkeeping Requirements

1. The permittee shall properly install, operate and maintain equipment to continuously monitor the scrubber water recirculation flow rate into the scrubber and the pH of the scrubber liquor while the emissions unit is in operation. The monitoring devices and any recorders shall be installed, calibrated, operated and maintained in accordance with the manufacturer's recommendations, instructions and operating manuals.

   The permittee shall collect and record the following information each day:

   a. the scrubber water recirculation flow rate, in gallons per minute, on a once per day basis;

   b. the pH of the scrubber liquor, on a once per day basis; and

   c. the operating times for the capture (collection) system, control device, monitoring equipment, and the associated emissions unit.

2. The permittee shall collect and record the following information each month for the entire facility:

   a. for all epitaxial reactors, the amount of hydrogen chloride (HCl) used (input), in pounds;

   b. for all epitaxial reactors, the amount of HCl released from the reaction of trichlorosilane,

in pounds;

c. for all epitaxial reactors, the amount of controlled emissions of each HAP, in tons;

d. for all emissions units, the amount of any other material used which contains HAPs, in tons;

e. for all emissions units, the individual HAP content for each HAP of each material used, in percent by weight (ton HAP/ton material);

f. the total individual HAP emissions for each HAP from all materials employed, in tons per month [for each HAP the sum of c. plus (d. times e.)];

g. the total combined HAP emissions from all materials employed, in tons per month (the sum of all HAPs as calculated in f.);

h. the updated rolling, 12-month summation of each individual HAP emissions, in pounds or tons. This shall include the information for the current month and the preceding eleven calender months ; and

i. the updated rolling, 12-month summation of total combined HAP emissions, in pounds or tons. This shall include the information for the current month and the preceding eleven calender months.

* A listing of the HAPs can be found in Section 112(b) of the Clean Air Act or can be obtained by contacting your Hamilton County Department of Environmental Services contact. This information does not have to be kept on a individual emissions unit basis.

3. The permit to install for emissions units P024 - P035 and P051 - P074 was evaluated based on the actual materials (typically coatings and cleanup materials) and the design parameters of the emissions unit's exhaust systems, as specified by the permittee in the permit to install application. The Ohio EPA's "Review of New Sources of Air Toxic Emissions" policy ("Air Toxic Policy") was applied for each pollutant emitted by this emissions unit using data from the permit to install application and the SCREEN 3.0 model (or other Ohio EPA approved model). The predicted 1-hour maximum ground-level concentration from the use of the SCREEN 3.0 model was compared to the Maximum Ground-Level Concentration (MAGLC).

The following summarizes the results of the modeling for the "worst case" pollutant(s):

Pollutant: HCl (CAS 7647-01-0)

TLV (ug/m^3): 2198

Maximum Hourly Emission Rate (lbs/hr): 0.132 lbs/hr HCl, P024 - P035 and P051 - P074, combined

Predicted 1-Hour Maximum Ground-Level Concentration (ug/m^3): 30.68 Ug/m^3, P024 - P035 and P051 - P074, combined

MAGLC (ug/m^3): 52.33

Physical changes to or in the method of operation of the emissions unit after it's installation or modification could affect the parameters used to determine whether or not the "Air Toxics Policy" is satisfied. Consequently, prior to making a change that could impact such parameters, the permittee shall conduct an evaluation to determine that the "Air Toxic Policy" will still be satisfied. If, upon evaluation, the permittee determines that the "Air Toxic Policy" will not be satisfied, the permittee will not make the change. Changes that can affect the parameters used in the "Air Toxic Policy" include the following:

a. changes in the composition of the materials used (typically for coatings or cleanup materials), or the use of new materials, that would result in the emission of a compound with a lower Threshold Limit Value (TLV), as indicated in the most recent version of the handbook entitled "American Conference of Governmental Industrial Hygienists (ACGIH)," than the lowest TLV value previously modeled;

b. changes in the composition of the materials, or use of new materials, that would result in an increase in emissions of any pollutant with a listed TLV that was proposed in the application and modeled; and

c. physical changes to the emissions unit or its exhaust parameters (e.g., increased/decreased exhaust flow, changes in stack height, changes in stack diameter, etc.).

If the permittee determines that the "Air Toxic Policy" will be satisfied for the above changes, the Ohio EPA will not consider the change(s) to be a "modification" under OAC rule 3745-31-01 solely due to the emissions of any type of toxic air contaminant not previously emitted, and a modification of the existing permit to install will not be required, even if the toxic air contaminant emissions are greater than the de minimis level in OAC rule 3745-15-05. If the change(s) is (are) defined as a modification under other provisions of the modification definition, then the permittee shall obtain a final permit to install prior to the change.

The permittee shall collect, record, and retain the following information when it conducts evaluations to determine that the changed emissions unit will satisfy the Air Toxic Policy:"

a. a description of the parameters changed(composition of materials, new pollutants emitted, change in stack/exhaust parameters, etc.);

b. documentation of it's evaluation and determination that the changed emissions unit still satisfies the "Air Toxic Policy"; and

c. when the computer modeling is performed, a copy of the resulting computer model runs that show the results of the application of the "Air Toxic Policy" for the change.

D. Reporting Requirements

1. The permittee shall submit quarterly deviation (excursion) reports to the Hamilton County Department of Environmental Services that identify all periods of time during which the following scrubber parameters were not maintained within the requirements of the Operational Restrictions:

   a. the scrubber water recirculation flow rate; and

   b. the scrubber solution pH.

   If no exceedances occurred during the reporting period then a report is required stating so. These reports shall be submitted by January 31, April 30, July 31, and October 31 of each year and shall cover the previous calendar quarters.

2. The permittee shall notify the Hamilton County Department of Environmental Services of any exceedance of the HAP emissions limitations set forth in term A.2.b. The reports shall be submitted to the Director (the Hamilton County Department of Environmental Services) by January 31, April 30, July 31 and October 31 of each year and shall cover the previous three calendar months (October through December, January through March, April through June and July through September, respectively.)

   If no exceedances occurred, the permittee shall state so in the report.

E. Testing Requirements

1. Emissions Limitations

   The hydrochloric acid (HCl) emissions shall not exceed 0.001 pound per hour (lb/hr)
   The hydrochloric acid (HCl) emissions shall not exceed 0.002 Tons per Year (TPY)

   Applicable Compliance Methods

Compliance with the hourly HCl emissions limitation shall be determined by the following calculations:

a. for the conversion of TCS to HCl in the scrubber:

actual trichlorosilane usage (lbs TCS/hr) x unit conversion trichlorosilane (1 mole TCS/135.4524 gMW TCS) x stoichiometric ratio (3 moles HCl/1 mole TCS) x unit conversion HCl (36.3609 gMW HCL/1 mole HCl) = lbs HCl/hr

b. for the addition of HCl in the hi-etch process:

actual cycle time (min/cycle) x actual production rate (cycles/hr) x actual flow rate (liters HCl/hr) x conversion factor (ft3/28.3168 liters) x conversion factor (1 lb HCl/9.7752 ft3 HCl) = lbs HCl/hr; and

c. (lbs HCl/hr from the conversion of TCS + lbs HCl/hr from the addition of HCl) x scrubber efficiency (1 - 99.5/100) = lbs HCl/hr from the scrubber stack

Compliance with the annual HCl emissions limitation shall be determined by the recordkeeping requirement in T&C C.2.h.

2. Emissions Limitation

Visible particulate emissions from any stack associated with emissions unit P058 shall not exceed 20 percent opacity, as a six-minute average, except as specified by rule

Applicable Compliance Method

Compliance shall be determined in accordance with Test Method 9 as set forth in "Appendix on Test Methods" in 40 CFR, Part 60 ("Standards of Performance for New Stationary Sources"), as such Appendix existed on July 1, 1996.

3. Emissions Limitations

9.9 TPY for any single HAP and 24.9 TPY for any combination of HAPs

Compliance with the HAPs emissions limits outlined in T&C A.2.b. shall be demonstrated by the recordkeeping requirements in T&C C.2.

4. Compliance with the operational restrictions for the wet scrubber in T&Cs B.1. and B.2. shall be demonstrated by the recordkeeping requirements in T&C C.1.

F. Miscellaneous Requirements

1. The following terms and conditions of this permit are federally enforceable: A, B, C.1, C.2, D and E.

PART II - SPECIAL TERMS AND CONDITIONS FOR SPECIFIC EMISSIONS UNIT(S)

A. Applicable Emissions Limitations and/or Control Requirements

1. The specific operations(s), property, and/or equipment which constitute this emissions unit are listed in the following table along with the applicable rules and/or requirements and with the applicable emissions limitations and/or control measures. Emissions from this unit shall not exceed the listed limitations, and the listed control measures shall be specified in narrative form following the table.

Operations, Property, and/or Equipment	Applicable Rules/Requirements	
P059 - B13 - AMT Barrel Reactor; CS-2 - Plant-wide condenser, scrubber, and hydrogen recovery unit	OAC rule 3745-31-05(A)(3)	OAC rule 3745-17-11(B)
	OAC rule 3745-31-05(C) (to avoid being subject to OAC rules 3745-31-28 and Title V permitting requirements)	
	OAC rule 3745-17-07(A)(1)	

Applicable Emissions Limitations/Control Measures	
The hydrochloric acid (HCl) emissions shall not exceed 0.001 pound per hour (lb/hr).	
The hydrochloric acid (HCl) emissions shall not exceed 0.002 Tons per Year (TPY).	See T&C A.2.c.
The requirements of this rule also include compliance with the requirements of OAC rule 3745-31-05(C) and OAC rule 3745-17-07(A)(1).	See T&C A.2.b.
Visible particulate emissions from any stack associated with emissions unit P059 shall not exceed 20 percent opacity, as a six-minute average, except as specified by rule.	
The emission limitation specified by this rule is less stringent than the emission limitation established pursuant to OAC rule 3745-31-05(A)(3).	

2. Additional Terms and Conditions

2.a The hourly emission limitations outlined in term A.1. are based upon the emissions unit's potential to emit. Therefore, no hourly records are required to demonstrate compliance

with these limits.

2.b The actual emissions of Hazardous Air Pollutants (HAPs), as identified in Section 112(b) of Title III of the Clean Air Act, from this facility shall not exceed 9.9 TPY for any single HAP and 24.9 TPY for any combination of HAPs. Compliance with the above limitations shall be based on a rolling, 12-month summation. The permittee has existing records to demonstrate compliance with these limits upon issuance of this permit.

2.c Compliance with OAC rule 3745-31-05(A)(3) shall be demonstrated by the use of a wet scrubber, compliance with the HCl emissions limits and compliance with the facility-wide HAPs emissions limits.

B. Operational Restrictions

1. The scrubber water recirculation flow rate shall be continuously maintained at a value of not less than 60 gallons per minute at all times while the emissions unit is in operation.

2. The pH of the scrubbing liquor shall be maintained within the range of 8-13 at all times while the emissions unit is in operation.

C. Monitoring and/or Recordkeeping Requirements

1. The permittee shall properly install, operate and maintain equipment to continuously monitor the scrubber water recirculation flow rate into the scrubber and the pH of the scrubber liquor while the emissions unit is in operation. The monitoring devices and any recorders shall be installed, calibrated, operated and maintained in accordance with the manufacturer's recommendations, instructions and operating manuals.

   The permittee shall collect and record the following information each day:

   a. the scrubber water recirculation flow rate, in gallons per minute, on a once per day basis;

   b. the pH of the scrubber liquor, on a once per day basis; and

   c. the operating times for the capture (collection) system, control device, monitoring equipment, and the associated emissions unit.

2. The permittee shall collect and record the following information each month for the entire facility:

   a. for all epitaxial reactors, the amount of hydrogen chloride (HCl) used (input), in pounds;

   b. for all epitaxial reactors, the amount of HCl released from the reaction of trichlorosilane,

in pounds;

c. for all epitaxial reactors, the amount of controlled emissions of each HAP, in tons;

d. for all emissions units, the amount of any other material used which contains HAPs, in tons;

e. for all emissions units, the individual HAP content for each HAP of each material used, in percent by weight (ton HAP/ton material);

f. the total individual HAP emissions for each HAP from all materials employed, in tons per month [for each HAP the sum of c. plus (d. times e.)];

g. the total combined HAP emissions from all materials employed, in tons per month (the sum of all HAPs as calculated in f.);

h. the updated rolling, 12-month summation of each individual HAP emissions, in pounds or tons. This shall include the information for the current month and the preceding eleven calender months ; and

i. the updated rolling, 12-month summation of total combined HAP emissions, in pounds or tons. This shall include the information for the current month and the preceding eleven calender months.

* A listing of the HAPs can be found in Section 112(b) of the Clean Air Act or can be obtained by contacting your Hamilton County Department of Environmental Services contact. This information does not have to be kept on a individual emissions unit basis.

3. The permit to install for emissions units P024 - P035 and P051 - P074 was evaluated based on the actual materials (typically coatings and cleanup materials) and the design parameters of the emissions unit's exhaust systems, as specified by the permittee in the permit to install application. The Ohio EPA's "Review of New Sources of Air Toxic Emissions" policy ("Air Toxic Policy") was applied for each pollutant emitted by this emissions unit using data from the permit to install application and the SCREEN 3.0 model (or other Ohio EPA approved model). The predicted 1-hour maximum ground-level concentration from the use of the SCREEN 3.0 model was compared to the Maximum Ground-Level Concentration (MAGLC).

The following summarizes the results of the modeling for the "worst case" pollutant(s):

Pollutant: HCl (CAS 7647-01-0)

TLV (ug/m^3): 2198

Maximum Hourly Emission Rate (lbs/hr): 0.132 lbs/hr HCl, P024 - P035 and P051 - P074, combined

Predicted 1-Hour Maximum Ground-Level Concentration (ug/m^3): 30.68 Ug/m^3, P024 - P035 and P051 - P074, combined

MAGLC (ug/m^3): 52.33

Physical changes to or in the method of operation of the emissions unit after it's installation or modification could affect the parameters used to determine whether or not the "Air Toxics Policy" is satisfied. Consequently, prior to making a change that could impact such parameters, the permittee shall conduct an evaluation to determine that the "Air Toxic Policy" will still be satisfied. If, upon evaluation, the permittee determines that the "Air Toxic Policy" will not be satisfied, the permittee will not make the change. Changes that can affect the parameters used in the "Air Toxic Policy" include the following:

a. changes in the composition of the materials used (typically for coatings or cleanup materials), or the use of new materials, that would result in the emission of a compound with a lower Threshold Limit Value (TLV), as indicated in the most recent version of the handbook entitled "American Conference of Governmental Industrial Hygienists (ACGIH)," than the lowest TLV value previously modeled;

b. changes in the composition of the materials, or use of new materials, that would result in an increase in emissions of any pollutant with a listed TLV that was proposed in the application and modeled; and

c. physical changes to the emissions unit or its exhaust parameters (e.g., increased/decreased exhaust flow, changes in stack height, changes in stack diameter, etc.).

If the permittee determines that the "Air Toxic Policy" will be satisfied for the above changes, the Ohio EPA will not consider the change(s) to be a "modification" under OAC rule 3745-31-01 solely due to the emissions of any type of toxic air contaminant not previously emitted, and a modification of the existing permit to install will not be required, even if the toxic air contaminant emissions are greater than the de minimis level in OAC rule 3745-15-05. If the change(s) is (are) defined as a modification under other provisions of the modification definition, then the permittee shall obtain a final permit to install prior to the change.

The permittee shall collect, record, and retain the following information when it conducts evaluations to determine that the changed emissions unit will satisfy the Air Toxic Policy:"

a. a description of the parameters changed(composition of materials, new pollutants emitted, change in stack/exhaust parameters, etc.);

b. documentation of it's evaluation and determination that the changed emissions unit still satisfies the "Air Toxic Policy"; and

c. when the computer modeling is performed, a copy of the resulting computer model runs that show the results of the application of the "Air Toxic Policy" for the change.

D. Reporting Requirements

1. The permittee shall submit quarterly deviation (excursion) reports to the Hamilton County Department of Environmental Services that identify all periods of time during which the following scrubber parameters were not maintained within the requirements of the Operational Restrictions:

   a. the scrubber water recirculation flow rate; and

   b. the scrubber solution pH.

   If no exceedances occurred during the reporting period then a report is required stating so. These reports shall be submitted by January 31, April 30, July 31, and October 31 of each year and shall cover the previous calendar quarters..

2. The permittee shall notify the Hamilton County Department of Environmental Services of any exceedance of the HAP emissions limitations set forth in term A.2.b. The reports shall be submitted to the Director (the Hamilton County Department of Environmental Services) by January 31, April 30, July 31 and October 31 of each year and shall cover the previous three calendar months (October through December, January through March, April through June and July through September, respectively.)

   If no exceedances occurred, the permittee shall state so in the report.

E. Testing Requirements

1. Emissions Limitations

   The hydrochloric acid (HCl) emissions shall not exceed 0.001 pound per hour (lb/hr)
   The hydrochloric acid (HCl) emissions shall not exceed 0.002 Tons per Year (TPY)

   Applicable Compliance Methods

Compliance with the hourly HCl emissions limitation shall be determined by the following calculations:

a. for the conversion of TCS to HCl in the scrubber:

actual trichlorosilane usage (lbs TCS/hr) x unit conversion trichlorosilane (1 mole TCS/135.4524 gMW TCS) x stoichiometric ratio (3 moles HCl/1 mole TCS) x unit conversion HCl (36.3609 gMW HCL/1 mole HCl) = lbs HCl/hr

b. for the addition of HCl in the hi-etch process:

actual cycle time (min/cycle) x actual production rate (cycles/hr) x actual flow rate (liters HCl/hr) x conversion factor (ft3/28.3168 liters) x conversion factor (1 lb HCl/9.7752 ft3 HCl) = lbs HCl/hr; and

c. (lbs HCl/hr from the conversion of TCS + lbs HCl/hr from the addition of HCl) x scrubber efficiency (1 - 99.5/100) = lbs HCl/hr from the scrubber stack

Compliance with the annual HCl emissions limitation shall be determined by the recordkeeping requirement in T&C C.2.h.

2. Emissions Limitation

Visible particulate emissions from any stack associated with emissions unit P059 shall not exceed 20 percent opacity, as a six-minute average, except as specified by rule

Applicable Compliance Method

Compliance shall be determined in accordance with Test Method 9 as set forth in "Appendix on Test Methods" in 40 CFR, Part 60 ("Standards of Performance for New Stationary Sources"), as such Appendix existed on July 1, 1996.

3. Emissions Limitations

9.9 TPY for any single HAP and 24.9 TPY for any combination of HAPs

Compliance with the HAPs emissions limits outlined in T&C A.2.b. shall be demonstrated by the recordkeeping requirements in T&C C.2.

4. Compliance with the operational restrictions for the wet scrubber in T&Cs B.1. and B.2. shall be demonstrated by the recordkeeping requirements in T&C C.1.

F. Miscellaneous Requirements

1. The following terms and conditions of this permit are federally enforceable: A, B, C.1, C.2, D and E.

PART II - SPECIAL TERMS AND CONDITIONS FOR SPECIFIC EMISSIONS UNIT(S)

A. Applicable Emissions Limitations and/or Control Requirements

1. The specific operations(s), property, and/or equipment which constitute this emissions unit are listed in the following table along with the applicable rules and/or requirements and with the applicable emissions limitations and/or control measures. Emissions from this unit shall not exceed the listed limitations, and the listed control measures shall be specified in narrative form following the table.

Operations, Property, and/or Equipment	Applicable Rules/Requirements	
P060 - B14 - AMT Barrel Reactor; CS-2 - Plant-wide condenser, scrubber, and hydrogen recovery unit	OAC rule 3745-31-05(A)(3)	OAC rule 3745-17-11(B)
	OAC rule 3745-31-05(C) (to avoid being subject to OAC rules 3745-31-28 and Title V permitting requirements)	
	OAC rule 3745-17-07(A)(1)	

Applicable Emissions Limitations/Control Measures
The hydrochloric acid (HCl) emissions shall not exceed 0.001 pound per hour (lb/hr).
The hydrochloric acid (HCl) emissions shall not exceed 0.002 Tons per Year (TPY). See T&C A.2.c.
The requirements of this rule also include compliance with the requirements of OAC rule 3745-31-05(C) and OAC rule 3745-17-07(A)(1). See T&C A.2.b.
Visible particulate emissions from any stack associated with emissions unit P060 shall not exceed 20 percent opacity, as a six-minute average, except as specified by rule.
The emission limitation specified by this rule is less stringent than the emission limitation established pursuant to OAC rule 3745-31-05(A)(3).

2. Additional Terms and Conditions

2.a The hourly emission limitations outlined in term A.1. are based upon the emissions unit's potential to emit. Therefore, no hourly records are required to demonstrate compliance

with these limits.

2.b The actual emissions of Hazardous Air Pollutants (HAPs), as identified in Section 112(b) of Title III of the Clean Air Act, from this facility shall not exceed 9.9 TPY for any single HAP and 24.9 TPY for any combination of HAPs. Compliance with the above limitations shall be based on a rolling, 12-month summation. The permittee has existing records to demonstrate compliance with these limits upon issuance of this permit.

2.c Compliance with OAC rule 3745-31-05(A)(3) shall be demonstrated by the use of a wet scrubber, compliance with the HCl emissions limits and compliance with the facility-wide HAPs emissions limits.

B. Operational Restrictions

1. The scrubber water recirculation flow rate shall be continuously maintained at a value of not less than 60 gallons per minute at all times while the emissions unit is in operation.

2. The pH of the scrubbing liquor shall be maintained within the range of 8-13 at all times while the emissions unit is in operation.

C. Monitoring and/or Recordkeeping Requirements

1. The permittee shall properly install, operate and maintain equipment to continuously monitor the scrubber water recirculation flow rate into the scrubber and the pH of the scrubber liquor while the emissions unit is in operation. The monitoring devices and any recorders shall be installed, calibrated, operated and maintained in accordance with the manufacturer's recommendations, instructions and operating manuals.

   The permittee shall collect and record the following information each day:

   a. the scrubber water recirculation flow rate, in gallons per minute, on a once per day basis;

   b. the pH of the scrubber liquor, on a once per day basis; and

   c. the operating times for the capture (collection) system, control device, monitoring equipment, and the associated emissions unit.

2. The permittee shall collect and record the following information each month for the entire facility:

   a. for all epitaxial reactors, the amount of hydrogen chloride (HCl) used (input), in pounds;

   b. for all epitaxial reactors, the amount of HCl released from the reaction of trichlorosilane,

in pounds;

c. for all epitaxial reactors, the amount of controlled emissions of each HAP, in tons;

d. for all emissions units, the amount of any other material used which contains HAPs, in tons;

e. for all emissions units, the individual HAP content for each HAP of each material used, in percent by weight (ton HAP/ton material);

f. the total individual HAP emissions for each HAP from all materials employed, in tons per month [for each HAP the sum of c. plus (d. times e.)];

g. the total combined HAP emissions from all materials employed, in tons per month (the sum of all HAPs as calculated in f.);

h. the updated rolling, 12-month summation of each individual HAP emissions, in pounds or tons. This shall include the information for the current month and the preceding eleven calender months ; and

i. the updated rolling, 12-month summation of total combined HAP emissions, in pounds or tons. This shall include the information for the current month and the preceding eleven calender months.

* A listing of the HAPs can be found in Section 112(b) of the Clean Air Act or can be obtained by contacting your Hamilton County Department of Environmental Services contact. This information does not have to be kept on a individual emissions unit basis.

3. The permit to install for emissions units P024 - P035 and P051 - P074 was evaluated based on the actual materials (typically coatings and cleanup materials) and the design parameters of the emissions unit's exhaust systems, as specified by the permittee in the permit to install application. The Ohio EPA's "Review of New Sources of Air Toxic Emissions" policy ("Air Toxic Policy") was applied for each pollutant emitted by this emissions unit using data from the permit to install application and the SCREEN 3.0 model (or other Ohio EPA approved model). The predicted 1-hour maximum ground-level concentration from the use of the SCREEN 3.0 model was compared to the Maximum Ground-Level Concentration (MAGLC).

The following summarizes the results of the modeling for the "worst case" pollutant(s):

Pollutant: HCl (CAS 7647-01-0)

TLV (ug/m^3): 2198

Maximum Hourly Emission Rate (lbs/hr): 0.132 lbs/hr HCl, P024 - P035 and P051 - P074, combined

Predicted 1-Hour Maximum Ground-Level Concentration (ug/m^3): 30.68 Ug/m^3, P024 - P035 and P051 - P074, combined

MAGLC (ug/m^3): 52.33

Physical changes to or in the method of operation of the emissions unit after it's installation or modification could affect the parameters used to determine whether or not the "Air Toxics Policy" is satisfied. Consequently, prior to making a change that could impact such parameters, the permittee shall conduct an evaluation to determine that the "Air Toxic Policy" will still be satisfied. If, upon evaluation, the permittee determines that the "Air Toxic Policy" will not be satisfied, the permittee will not make the change. Changes that can affect the parameters used in the "Air Toxic Policy" include the following:

a. changes in the composition of the materials used (typically for coatings or cleanup materials), or the use of new materials, that would result in the emission of a compound with a lower Threshold Limit Value (TLV), as indicated in the most recent version of the handbook entitled "American Conference of Governmental Industrial Hygienists (ACGIH)," than the lowest TLV value previously modeled;

b. changes in the composition of the materials, or use of new materials, that would result in an increase in emissions of any pollutant with a listed TLV that was proposed in the application and modeled; and

c. physical changes to the emissions unit or its exhaust parameters (e.g., increased/decreased exhaust flow, changes in stack height, changes in stack diameter, etc.).

If the permittee determines that the "Air Toxic Policy" will be satisfied for the above changes, the Ohio EPA will not consider the change(s) to be a "modification" under OAC rule 3745-31-01 solely due to the emissions of any type of toxic air contaminant not previously emitted, and a modification of the existing permit to install will not be required, even if the toxic air contaminant emissions are greater than the de minimis level in OAC rule 3745-15-05. If the change(s) is (are) defined as a modification under other provisions of the modification definition, then the permittee shall obtain a final permit to install prior to the change.

The permittee shall collect, record, and retain the following information when it conducts evaluations to determine that the changed emissions unit will satisfy the Air Toxic Policy:"

a. a description of the parameters changed(composition of materials, new pollutants emitted, change in stack/exhaust parameters, etc.);

b. documentation of it's evaluation and determination that the changed emissions unit still satisfies the "Air Toxic Policy"; and

c. when the computer modeling is performed, a copy of the resulting computer model runs that show the results of the application of the "Air Toxic Policy" for the change.

D. Reporting Requirements

1. The permittee shall submit quarterly deviation (excursion) reports to the Hamilton County Department of Environmental Services that identify all periods of time during which the following scrubber parameters were not maintained within the requirements of the Operational Restrictions:

   a. the scrubber water recirculation flow rate; and

   b. the scrubber solution pH.

   If no exceedances occurred during the reporting period then a report is required stating so. These reports shall be submitted by January 31, April 30, July 31, and October 31 of each year and shall cover the previous calendar quarters.

2. The permittee shall notify the Hamilton County Department of Environmental Services of any exceedance of the HAP emissions limitations set forth in term A.2.b. The reports shall be submitted to the Director (the Hamilton County Department of Environmental Services) by January 31, April 30, July 31 and October 31 of each year and shall cover the previous three calendar months (October through December, January through March, April through June and July through September, respectively.)

   If no exceedances occurred, the permittee shall state so in the report.

E. Testing Requirements

1. Emissions Limitations

   The hydrochloric acid (HCl) emissions shall not exceed 0.001 pound per hour (lb/hr)
   The hydrochloric acid (HCl) emissions shall not exceed 0.002 Tons per Year (TPY)

   Applicable Compliance Methods

Compliance with the hourly HCl emissions limitation shall be determined by the following calculations:

a. for the conversion of TCS to HCl in the scrubber:

actual trichlorosilane usage (lbs TCS/hr) x unit conversion trichlorosilane (1 mole TCS/135.4524 gMW TCS) x stoichiometric ratio (3 moles HCl/1 mole TCS) x unit conversion HCl (36.3609 gMW HCL/1 mole HCl) = lbs HCl/hr

b. for the addition of HCl in the hi-etch process:

actual cycle time (min/cycle) x actual production rate (cycles/hr) x actual flow rate (liters HCl/hr) x conversion factor (ft3/28.3168 liters) x conversion factor (1 lb HCl/9.7752 ft3 HCl) = lbs HCl/hr; and

c. (lbs HCl/hr from the conversion of TCS + lbs HCl/hr from the addition of HCl) x scrubber efficiency (1 - 99.5/100) = lbs HCl/hr from the scrubber stack

Compliance with the annual HCl emissions limitation shall be determined by the recordkeeping requirement in T&C C.2.h.

2. Emissions Limitation

Visible particulate emissions from any stack associated with emissions unit P060 shall not exceed 20 percent opacity, as a six-minute average, except as specified by rule

Applicable Compliance Method

Compliance shall be determined in accordance with Test Method 9 as set forth in "Appendix on Test Methods" in 40 CFR, Part 60 ("Standards of Performance for New Stationary Sources"), as such Appendix existed on July 1, 1996.

3. Emissions Limitations

9.9 TPY for any single HAP and 24.9 TPY for any combination of HAPs

Compliance with the HAPs emissions limits outlined in T&C A.2.b. shall be demonstrated by the recordkeeping requirements in T&C C.2.

4. Compliance with the operational restrictions for the wet scrubber in T&Cs B.1. and B.2. shall be demonstrated by the recordkeeping requirements in T&C C.1.

F. Miscellaneous Requirements

1. The following terms and conditions of this permit are federally enforceable: A, B, C.1, C.2, D and E.

PART II - SPECIAL TERMS AND CONDITIONS FOR SPECIFIC EMISSIONS UNIT(S)

A. Applicable Emissions Limitations and/or Control Requirements

1. The specific operations(s), property, and/or equipment which constitute this emissions unit are listed in the following table along with the applicable rules and/or requirements and with the applicable emissions limitations and/or control measures. Emissions from this unit shall not exceed the listed limitations, and the listed control measures shall be specified in narrative form following the table.

Operations, Property, and/or Equipment	Applicable Rules/Requirements	
P061 - B15 - AMT Barrel Reactor; CS-2 - Plant-wide condenser, scrubber, and hydrogen recovery unit	OAC rule 3745-31-05(A)(3)	OAC rule 3745-17-11(B)
	OAC rule 3745-31-05(C) (to avoid being subject to OAC rules 3745-31-28 and Title V permitting requirements)	
	OAC rule 3745-17-07(A)(1)	

Applicable Emissions Limitations/Control Measures	
The hydrochloric acid (HCl) emissions shall not exceed 0.001 pound per hour (lb/hr).	
The hydrochloric acid (HCl) emissions shall not exceed 0.002 Tons per Year (TPY).	See T&C A.2.c.
The requirements of this rule also include compliance with the requirements of OAC rule 3745-31-05(C) and OAC rule 3745-17-07(A)(1).	See T&C A.2.b.
Visible particulate emissions from any stack associated with emissions unit P061 shall not exceed 20 percent opacity, as a six-minute average, except as specified by rule.	
The emission limitation specified by this rule is less stringent than the emission limitation established pursuant to OAC rule 3745-31-05(A)(3).	

2. Additional Terms and Conditions

2.a The hourly emission limitations outlined in term A.1. are based upon the emissions unit's potential to emit. Therefore, no hourly records are required to demonstrate compliance

with these limits.

2.b The actual emissions of Hazardous Air Pollutants (HAPs), as identified in Section 112(b) of Title III of the Clean Air Act, from this facility shall not exceed 9.9 TPY for any single HAP and 24.9 TPY for any combination of HAPs. Compliance with the above limitations shall be based on a rolling, 12-month summation. The permittee has existing records to demonstrate compliance with these limits upon issuance of this permit.

2.c Compliance with OAC rule 3745-31-05(A)(3) shall be demonstrated by the use of a wet scrubber, compliance with the HCl emissions limits and compliance with the facility-wide HAPs emissions limits.

B. Operational Restrictions

1. The scrubber water recirculation flow rate shall be continuously maintained at a value of not less than 60 gallons per minute at all times while the emissions unit is in operation.

2. The pH of the scrubbing liquor shall be maintained within the range of 8-13 at all times while the emissions unit is in operation.

C. Monitoring and/or Recordkeeping Requirements

1. The permittee shall properly install, operate and maintain equipment to continuously monitor the scrubber water recirculation flow rate into the scrubber and the pH of the scrubber liquor while the emissions unit is in operation. The monitoring devices and any recorders shall be installed, calibrated, operated and maintained in accordance with the manufacturer's recommendations, instructions and operating manuals.

   The permittee shall collect and record the following information each day:

   a. the scrubber water recirculation flow rate, in gallons per minute, on a once per day basis;

   b. the pH of the scrubber liquor, on a once per day basis; and

   c. the operating times for the capture (collection) system, control device, monitoring equipment, and the associated emissions unit.

2. The permittee shall collect and record the following information each month for the entire facility:

   a. for all epitaxial reactors, the amount of hydrogen chloride (HCl) used (input), in pounds;

   b. for all epitaxial reactors, the amount of HCl released from the reaction of trichlorosilane,

in pounds;

c. for all epitaxial reactors, the amount of controlled emissions of each HAP, in tons;

d. for all emissions units, the amount of any other material used which contains HAPs, in tons;

e. for all emissions units, the individual HAP content for each HAP of each material used, in percent by weight (ton HAP/ton material);

f. the total individual HAP emissions for each HAP from all materials employed, in tons per month [for each HAP the sum of c. plus (d. times e.)];

g. the total combined HAP emissions from all materials employed, in tons per month (the sum of all HAPs as calculated in f.);

h. the updated rolling, 12-month summation of each individual HAP emissions, in pounds or tons. This shall include the information for the current month and the preceding eleven calender months ; and

i. the updated rolling, 12-month summation of total combined HAP emissions, in pounds or tons. This shall include the information for the current month and the preceding eleven calender months.

* A listing of the HAPs can be found in Section 112(b) of the Clean Air Act or can be obtained by contacting your Hamilton County Department of Environmental Services contact. This information does not have to be kept on a individual emissions unit basis.

3. The permit to install for emissions units P024 - P035 and P051 - P074 was evaluated based on the actual materials (typically coatings and cleanup materials) and the design parameters of the emissions unit's exhaust systems, as specified by the permittee in the permit to install application. The Ohio EPA's "Review of New Sources of Air Toxic Emissions" policy ("Air Toxic Policy") was applied for each pollutant emitted by this emissions unit using data from the permit to install application and the SCREEN 3.0 model (or other Ohio EPA approved model). The predicted 1-hour maximum ground-level concentration from the use of the SCREEN 3.0 model was compared to the Maximum Ground-Level Concentration (MAGLC).

The following summarizes the results of the modeling for the "worst case" pollutant(s):

Pollutant: HCl (CAS 7647-01-0)

TLV (ug/m^3): 2198

Maximum Hourly Emission Rate (lbs/hr): 0.132 lbs/hr HCl, P024 - P035 and P051 - P074, combined

Predicted 1-Hour Maximum Ground-Level Concentration (ug/m^3): 30.68 Ug/m^3, P024 - P035 and P051 - P074, combined

MAGLC (ug/m^3): 52.33

Physical changes to or in the method of operation of the emissions unit after it's installation or modification could affect the parameters used to determine whether or not the "Air Toxics Policy" is satisfied. Consequently, prior to making a change that could impact such parameters, the permittee shall conduct an evaluation to determine that the "Air Toxic Policy" will still be satisfied. If, upon evaluation, the permittee determines that the "Air Toxic Policy" will not be satisfied, the permittee will not make the change. Changes that can affect the parameters used in the "Air Toxic Policy" include the following:

a. changes in the composition of the materials used (typically for coatings or cleanup materials), or the use of new materials, that would result in the emission of a compound with a lower Threshold Limit Value (TLV), as indicated in the most recent version of the handbook entitled "American Conference of Governmental Industrial Hygienists (ACGIH)," than the lowest TLV value previously modeled;

b. changes in the composition of the materials, or use of new materials, that would result in an increase in emissions of any pollutant with a listed TLV that was proposed in the application and modeled; and

c. physical changes to the emissions unit or its exhaust parameters (e.g., increased/decreased exhaust flow, changes in stack height, changes in stack diameter, etc.).

If the permittee determines that the "Air Toxic Policy" will be satisfied for the above changes, the Ohio EPA will not consider the change(s) to be a "modification" under OAC rule 3745-31-01 solely due to the emissions of any type of toxic air contaminant not previously emitted, and a modification of the existing permit to install will not be required, even if the toxic air contaminant emissions are greater than the de minimis level in OAC rule 3745-15-05. If the change(s) is (are) defined as a modification under other provisions of the modification definition, then the permittee shall obtain a final permit to install prior to the change.

The permittee shall collect, record, and retain the following information when it conducts evaluations to determine that the changed emissions unit will satisfy the Air Toxic Policy:"

a. a description of the parameters changed(composition of materials, new pollutants emitted, change in stack/exhaust parameters, etc.);

b. documentation of it's evaluation and determination that the changed emissions unit still satisfies the "Air Toxic Policy"; and

c. when the computer modeling is performed, a copy of the resulting computer model runs that show the results of the application of the "Air Toxic Policy" for the change.

D. Reporting Requirements

1. The permittee shall submit quarterly deviation (excursion) reports to the Hamilton County Department of Environmental Services that identify all periods of time during which the following scrubber parameters were not maintained within the requirements of the Operational Restrictions:

   a. the scrubber water recirculation flow rate; and

   b. the scrubber solution pH.

   If no exceedances occurred during the reporting period then a report is required stating so. These reports shall be submitted by January 31, April 30, July 31, and October 31 of each year and shall cover the previous calendar quarters.

2. The permittee shall notify the Hamilton County Department of Environmental Services of any exceedance of the HAP emissions limitations set forth in term A.2.b. The reports shall be submitted to the Director (the Hamilton County Department of Environmental Services) by January 31, April 30, July 31 and October 31 of each year and shall cover the previous three calendar months (October through December, January through March, April through June and July through September, respectively.)

   If no exceedances occurred, the permittee shall state so in the report.

E. Testing Requirements

1. Emissions Limitations

   The hydrochloric acid (HCl) emissions shall not exceed 0.001 pound per hour (lb/hr)
   The hydrochloric acid (HCl) emissions shall not exceed 0.002 Tons per Year (TPY)

   Applicable Compliance Methods

Compliance with the hourly HCl emissions limitation shall be determined by the following calculations:

a. for the conversion of TCS to HCl in the scrubber:

actual trichlorosilane usage (lbs TCS/hr) x unit conversion trichlorosilane (1 mole TCS/135.4524 gMW TCS) x stoichiometric ratio (3 moles HCl/1 mole TCS) x unit conversion HCl (36.3609 gMW HCL/1 mole HCl) = lbs HCl/hr

b. for the addition of HCl in the hi-etch process:

actual cycle time (min/cycle) x actual production rate (cycles/hr) x actual flow rate (liters HCl/hr) x conversion factor (ft3/28.3168 liters) x conversion factor (1 lb HCl/9.7752 ft3 HCl) = lbs HCl/hr; and

c. (lbs HCl/hr from the conversion of TCS + lbs HCl/hr from the addition of HCl) x scrubber efficiency (1 - 99.5/100) = lbs HCl/hr from the scrubber stack

Compliance with the annual HCl emissions limitation shall be determined by the recordkeeping requirement in T&C C.2.h.

2. Emissions Limitation

Visible particulate emissions from any stack associated with emissions unit P061 shall not exceed 20 percent opacity, as a six-minute average, except as specified by rule

Applicable Compliance Method

Compliance shall be determined in accordance with Test Method 9 as set forth in "Appendix on Test Methods" in 40 CFR, Part 60 ("Standards of Performance for New Stationary Sources"), as such Appendix existed on July 1, 1996.

3. Emissions Limitations

9.9 TPY for any single HAP and 24.9 TPY for any combination of HAPs

Compliance with the HAPs emissions limits outlined in T&C A.2.b. shall be demonstrated by the recordkeeping requirements in T&C C.2.

4. Compliance with the operational restrictions for the wet scrubber in T&Cs B.1. and B.2. shall be demonstrated by the recordkeeping requirements in T&C C.1.

F. Miscellaneous Requirements

1. The following terms and conditions of this permit are federally enforceable: A, B, C.1, C.2, D and E.

PART II - SPECIAL TERMS AND CONDITIONS FOR SPECIFIC EMISSIONS UNIT(S)

A. Applicable Emissions Limitations and/or Control Requirements

1. The specific operations(s), property, and/or equipment which constitute this emissions unit are listed in the following table along with the applicable rules and/or requirements and with the applicable emissions limitations and/or control measures. Emissions from this unit shall not exceed the listed limitations, and the listed control measures shall be specified in narrative form following the table.

Operations, Property, and/or Equipment	Applicable Rules/Requirements	
P062 - B16 - AMT Barrel Reactor; CS-2 - Plant-wide condenser, scrubber, and hydrogen recovery unit	OAC rule 3745-31-05(A)(3)	OAC rule 3745-17-11(B)
	OAC rule 3745-31-05(C) (to avoid being subject to OAC rules 3745-31-28 and Title V permitting requirements)	
	OAC rule 3745-17-07(A)(1)	

Applicable Emissions Limitations/Control Measures
The hydrochloric acid (HCl) emissions shall not exceed 0.001 pound per hour (lb/hr).
The hydrochloric acid (HCl) emissions shall not exceed 0.002 Tons per Year (TPY).
See T&C A.2.c.
The requirements of this rule also include compliance with the requirements of OAC rule 3745-31-05(C) and OAC rule 3745-17-07(A)(1).
See T&C A.2.b.
Visible particulate emissions from any stack associated with emissions unit P062 shall not exceed 20 percent opacity, as a six-minute average, except as specified by rule.
The emission limitation specified by this rule is less stringent than the emission limitation established pursuant to OAC rule 3745-31-05(A)(3).

2. Additional Terms and Conditions

2.a The hourly emission limitations outlined in term A.1. are based upon the emissions unit's potential to emit. Therefore, no hourly records are required to demonstrate compliance

with these limits.

2.b The actual emissions of Hazardous Air Pollutants (HAPs), as identified in Section 112(b) of Title III of the Clean Air Act, from this facility shall not exceed 9.9 TPY for any single HAP and 24.9 TPY for any combination of HAPs. Compliance with the above limitations shall be based on a rolling, 12-month summation. The permittee has existing records to demonstrate compliance with these limits upon issuance of this permit.

2.c Compliance with OAC rule 3745-31-05(A)(3) shall be demonstrated by the use of a wet scrubber, compliance with the HCl emissions limits and compliance with the facility-wide HAPs emissions limits.

B. Operational Restrictions

1. The scrubber water recirculation flow rate shall be continuously maintained at a value of not less than 60 gallons per minute at all times while the emissions unit is in operation.

2. The pH of the scrubbing liquor shall be maintained within the range of 8-13 at all times while the emissions unit is in operation.

C. Monitoring and/or Recordkeeping Requirements

1. The permittee shall properly install, operate and maintain equipment to continuously monitor the scrubber water recirculation flow rate into the scrubber and the pH of the scrubber liquor while the emissions unit is in operation. The monitoring devices and any recorders shall be installed, calibrated, operated and maintained in accordance with the manufacturer's recommendations, instructions and operating manuals.

   The permittee shall collect and record the following information each day:

   a. the scrubber water recirculation flow rate, in gallons per minute, on a once per day basis;

   b. the pH of the scrubber liquor, on a once per day basis; and

   c. the operating times for the capture (collection) system, control device, monitoring equipment, and the associated emissions unit.

2. The permittee shall collect and record the following information each month for the entire facility:

   a. for all epitaxial reactors, the amount of hydrogen chloride (HCl) used (input), in pounds;

   b. for all epitaxial reactors, the amount of HCl released from the reaction of trichlorosilane,

in pounds;

c. for all epitaxial reactors, the amount of controlled emissions of each HAP, in tons;

d. for all emissions units, the amount of any other material used which contains HAPs, in tons;

e. for all emissions units, the individual HAP content for each HAP of each material used, in percent by weight (ton HAP/ton material);

f. the total individual HAP emissions for each HAP from all materials employed, in tons per month [for each HAP the sum of c. plus (d. times e.)];

g. the total combined HAP emissions from all materials employed, in tons per month (the sum of all HAPs as calculated in f.);

h. the updated rolling, 12-month summation of each individual HAP emissions, in pounds or tons. This shall include the information for the current month and the preceding eleven calender months ; and

i. the updated rolling, 12-month summation of total combined HAP emissions, in pounds or tons. This shall include the information for the current month and the preceding eleven calender months.

* A listing of the HAPs can be found in Section 112(b) of the Clean Air Act or can be obtained by contacting your Hamilton County Department of Environmental Services contact. This information does not have to be kept on a individual emissions unit basis.

3. The permit to install for emissions units P024 - P035 and P051 - P074 was evaluated based on the actual materials (typically coatings and cleanup materials) and the design parameters of the emissions unit's exhaust systems, as specified by the permittee in the permit to install application. The Ohio EPA's "Review of New Sources of Air Toxic Emissions" policy ("Air Toxic Policy") was applied for each pollutant emitted by this emissions unit using data from the permit to install application and the SCREEN 3.0 model (or other Ohio EPA approved model). The predicted 1-hour maximum ground-level concentration from the use of the SCREEN 3.0 model was compared to the Maximum Ground-Level Concentration (MAGLC).

The following summarizes the results of the modeling for the "worst case" pollutant(s):

Pollutant: HCl (CAS 7647-01-0)

TLV (ug/m^3): 2198

Maximum Hourly Emission Rate (lbs/hr): 0.132 lbs/hr HCl, P024 - P035 and P051 - P074, combined

Predicted 1-Hour Maximum Ground-Level Concentration (ug/m^3): 30.68 Ug/m^3, P024 - P035 and P051 - P074, combined

MAGLC (ug/m^3): 52.33

Physical changes to or in the method of operation of the emissions unit after it's installation or modification could affect the parameters used to determine whether or not the "Air Toxics Policy" is satisfied. Consequently, prior to making a change that could impact such parameters, the permittee shall conduct an evaluation to determine that the "Air Toxic Policy" will still be satisfied. If, upon evaluation, the permittee determines that the "Air Toxic Policy" will not be satisfied, the permittee will not make the change. Changes that can affect the parameters used in the "Air Toxic Policy" include the following:

a. changes in the composition of the materials used (typically for coatings or cleanup materials), or the use of new materials, that would result in the emission of a compound with a lower Threshold Limit Value (TLV), as indicated in the most recent version of the handbook entitled "American Conference of Governmental Industrial Hygienists (ACGIH)," than the lowest TLV value previously modeled;

b. changes in the composition of the materials, or use of new materials, that would result in an increase in emissions of any pollutant with a listed TLV that was proposed in the application and modeled; and

c. physical changes to the emissions unit or its exhaust parameters (e.g., increased/decreased exhaust flow, changes in stack height, changes in stack diameter, etc.).

If the permittee determines that the "Air Toxic Policy" will be satisfied for the above changes, the Ohio EPA will not consider the change(s) to be a "modification" under OAC rule 3745-31-01 solely due to the emissions of any type of toxic air contaminant not previously emitted, and a modification of the existing permit to install will not be required, even if the toxic air contaminant emissions are greater than the de minimis level in OAC rule 3745-15-05. If the change(s) is (are) defined as a modification under other provisions of the modification definition, then the permittee shall obtain a final permit to install prior to the change.

The permittee shall collect, record, and retain the following information when it conducts evaluations to determine that the changed emissions unit will satisfy the Air Toxic Policy:"

a. a description of the parameters changed(composition of materials, new pollutants emitted, change in stack/exhaust parameters, etc.);

b. documentation of it's evaluation and determination that the changed emissions unit still satisfies the "Air Toxic Policy"; and

c. when the computer modeling is performed, a copy of the resulting computer model runs that show the results of the application of the "Air Toxic Policy" for the change.

D. Reporting Requirements

1. The permittee shall submit quarterly deviation (excursion) reports to the Hamilton County Department of Environmental Services that identify all periods of time during which the following scrubber parameters were not maintained within the requirements of the Operational Restrictions:

   a. the scrubber water recirculation flow rate; and

   b. the scrubber solution pH.

   If no exceedances occurred during the reporting period then a report is required stating so. These reports shall be submitted by January 31, April 30, July 31, and October 31 of each year and shall cover the previous calendar quarters.

2. The permittee shall notify the Hamilton County Department of Environmental Services of any exceedance of the HAP emissions limitations set forth in term A.2.b. The reports shall be submitted to the Director (the Hamilton County Department of Environmental Services) by January 31, April 30, July 31 and October 31 of each year and shall cover the previous three calendar months (October through December, January through March, April through June and July through September, respectively.)

   If no exceedances occurred, the permittee shall state so in the report.

E. Testing Requirements

1. Emissions Limitations

   The hydrochloric acid (HCl) emissions shall not exceed 0.001 pound per hour (lb/hr)
   The hydrochloric acid (HCl) emissions shall not exceed 0.002 Tons per Year (TPY)

   Applicable Compliance Methods

Compliance with the hourly HCl emissions limitation shall be determined by the following calculations:

a. for the conversion of TCS to HCl in the scrubber:

actual trichlorosilane usage (lbs TCS/hr) x unit conversion trichlorosilane (1 mole TCS/135.4524 gMW TCS) x stoichiometric ratio (3 moles HCl/1 mole TCS) x unit conversion HCl (36.3609 gMW HCL/1 mole HCl) = lbs HCl/hr

b. for the addition of HCl in the hi-etch process:

actual cycle time (min/cycle) x actual production rate (cycles/hr) x actual flow rate (liters HCl/hr) x conversion factor (ft3/28.3168 liters) x conversion factor (1 lb HCl/9.7752 ft3 HCl) = lbs HCl/hr; and

c. (lbs HCl/hr from the conversion of TCS + lbs HCl/hr from the addition of HCl) x scrubber efficiency (1 - 99.5/100) = lbs HCl/hr from the scrubber stack

Compliance with the annual HCl emissions limitation shall be determined by the recordkeeping requirement in T&C C.2.h.

2. Emissions Limitation

Visible particulate emissions from any stack associated with emissions unit P062 shall not exceed 20 percent opacity, as a six-minute average, except as specified by rule

Applicable Compliance Method

Compliance shall be determined in accordance with Test Method 9 as set forth in "Appendix on Test Methods" in 40 CFR, Part 60 ("Standards of Performance for New Stationary Sources"), as such Appendix existed on July 1, 1996.

3. Emissions Limitations

9.9 TPY for any single HAP and 24.9 TPY for any combination of HAPs

Compliance with the HAPs emissions limits outlined in T&C A.2.b. shall be demonstrated by the recordkeeping requirements in T&C C.2.

4. Compliance with the operational restrictions for the wet scrubber in T&Cs B.1. and B.2. shall be demonstrated by the recordkeeping requirements in T&C C.1.

F. Miscellaneous Requirements

1. The following terms and conditions of this permit are federally enforceable: A, B, C.1, C.2, D and E.

PART II - SPECIAL TERMS AND CONDITIONS FOR SPECIFIC EMISSIONS UNIT(S)

A. Applicable Emissions Limitations and/or Control Requirements

1. The specific operations(s), property, and/or equipment which constitute this emissions unit are listed in the following table along with the applicable rules and/or requirements and with the applicable emissions limitations and/or control measures. Emissions from this unit shall not exceed the listed limitations, and the listed control measures shall be specified in narrative form following the table.

Operations, Property, and/or Equipment	Applicable Rules/Requirements	
P063 - B17 - AMT Barrel Reactor; CS-2 - Plant-wide condenser, scrubber, and hydrogen recovery unit	OAC rule 3745-31-05(A)(3)	OAC rule 3745-17-11(B)
	OAC rule 3745-31-05(C) (to avoid being subject to OAC rules 3745-31-28 and Title V permitting requirements)	
	OAC rule 3745-17-07(A)(1)	

Applicable Emissions Limitations/Control Measures
The hydrochloric acid (HCl) emissions shall not exceed 0.001 pound per hour (lb/hr).
The hydrochloric acid (HCl) emissions shall not exceed 0.002 Tons per Year (TPY).
See T&C A.2.c.
The requirements of this rule also include compliance with the requirements of OAC rule 3745-31-05(C) and OAC rule 3745-17-07(A)(1).
See T&C A.2.b.
Visible particulate emissions from any stack associated with emissions unit P063 shall not exceed 20 percent opacity, as a six-minute average, except as specified by rule.
The emission limitation specified by this rule is less stringent than the emission limitation established pursuant to OAC rule 3745-31-05(A)(3).

2. Additional Terms and Conditions

2.a The hourly emission limitations outlined in term A.1. are based upon the emissions unit's potential to emit. Therefore, no hourly records are required to demonstrate compliance

with these limits.

2.b The actual emissions of Hazardous Air Pollutants (HAPs), as identified in Section 112(b) of Title III of the Clean Air Act, from this facility shall not exceed 9.9 TPY for any single HAP and 24.9 TPY for any combination of HAPs. Compliance with the above limitations shall be based on a rolling, 12-month summation. The permittee has existing records to demonstrate compliance with these limits upon issuance of this permit.

2.c Compliance with OAC rule 3745-31-05(A)(3) shall be demonstrated by the use of a wet scrubber, compliance with the HCl emissions limits and compliance with the facility-wide HAPs emissions limits.

B. Operational Restrictions

1. The scrubber water recirculation flow rate shall be continuously maintained at a value of not less than 60 gallons per minute at all times while the emissions unit is in operation.

2. The pH of the scrubbing liquor shall be maintained within the range of 8-13 at all times while the emissions unit is in operation.

C. Monitoring and/or Recordkeeping Requirements

1. The permittee shall properly install, operate and maintain equipment to continuously monitor the scrubber water recirculation flow rate into the scrubber and the pH of the scrubber liquor while the emissions unit is in operation. The monitoring devices and any recorders shall be installed, calibrated, operated and maintained in accordance with the manufacturer's recommendations, instructions and operating manuals.

   The permittee shall collect and record the following information each day:

   a. the scrubber water recirculation flow rate, in gallons per minute, on a once per day basis;

   b. the pH of the scrubber liquor, on a once per day basis; and

   c. the operating times for the capture (collection) system, control device, monitoring equipment, and the associated emissions unit.

2. The permittee shall collect and record the following information each month for the entire facility:

   a. for all epitaxial reactors, the amount of hydrogen chloride (HCl) used (input), in pounds;

   b. for all epitaxial reactors, the amount of HCl released from the reaction of trichlorosilane,

in pounds;

c. for all epitaxial reactors, the amount of controlled emissions of each HAP, in tons;

d. for all emissions units, the amount of any other material used which contains HAPs, in tons;

e. for all emissions units, the individual HAP content for each HAP of each material used, in percent by weight (ton HAP/ton material);

f. the total individual HAP emissions for each HAP from all materials employed, in tons per month [for each HAP the sum of c. plus (d. times e.)];

g. the total combined HAP emissions from all materials employed, in tons per month (the sum of all HAPs as calculated in f.);

h. the updated rolling, 12-month summation of each individual HAP emissions, in pounds or tons. This shall include the information for the current month and the preceding eleven calender months ; and

i. the updated rolling, 12-month summation of total combined HAP emissions, in pounds or tons. This shall include the information for the current month and the preceding eleven calender months.

* A listing of the HAPs can be found in Section 112(b) of the Clean Air Act or can be obtained by contacting your Hamilton County Department of Environmental Services contact. This information does not have to be kept on a individual emissions unit basis.

3. The permit to install for emissions units P024 - P035 and P051 - P074 was evaluated based on the actual materials (typically coatings and cleanup materials) and the design parameters of the emissions unit's exhaust systems, as specified by the permittee in the permit to install application. The Ohio EPA's "Review of New Sources of Air Toxic Emissions" policy ("Air Toxic Policy") was applied for each pollutant emitted by this emissions unit using data from the permit to install application and the SCREEN 3.0 model (or other Ohio EPA approved model). The predicted 1-hour maximum ground-level concentration from the use of the SCREEN 3.0 model was compared to the Maximum Ground-Level Concentration (MAGLC).

The following summarizes the results of the modeling for the "worst case" pollutant(s):

Pollutant: HCl (CAS 7647-01-0)

TLV (ug/m^3): 2198

Maximum Hourly Emission Rate (lbs/hr): 0.132 lbs/hr HCl, P024 - P035 and P051 - P074, combined

Predicted 1-Hour Maximum Ground-Level Concentration (ug/m^3): 30.68 Ug/m^3, P024 - P035 and P051 - P074, combined

MAGLC (ug/m^3): 52.33

Physical changes to or in the method of operation of the emissions unit after it's installation or modification could affect the parameters used to determine whether or not the "Air Toxics Policy" is satisfied. Consequently, prior to making a change that could impact such parameters, the permittee shall conduct an evaluation to determine that the "Air Toxic Policy" will still be satisfied. If, upon evaluation, the permittee determines that the "Air Toxic Policy" will not be satisfied, the permittee will not make the change. Changes that can affect the parameters used in the "Air Toxic Policy" include the following:

a. changes in the composition of the materials used (typically for coatings or cleanup materials), or the use of new materials, that would result in the emission of a compound with a lower Threshold Limit Value (TLV), as indicated in the most recent version of the handbook entitled "American Conference of Governmental Industrial Hygienists (ACGIH)," than the lowest TLV value previously modeled;

b. changes in the composition of the materials, or use of new materials, that would result in an increase in emissions of any pollutant with a listed TLV that was proposed in the application and modeled; and

c. physical changes to the emissions unit or its exhaust parameters (e.g., increased/decreased exhaust flow, changes in stack height, changes in stack diameter, etc.).

If the permittee determines that the "Air Toxic Policy" will be satisfied for the above changes, the Ohio EPA will not consider the change(s) to be a "modification" under OAC rule 3745-31-01 solely due to the emissions of any type of toxic air contaminant not previously emitted, and a modification of the existing permit to install will not be required, even if the toxic air contaminant emissions are greater than the de minimis level in OAC rule 3745-15-05. If the change(s) is (are) defined as a modification under other provisions of the modification definition, then the permittee shall obtain a final permit to install prior to the change.

The permittee shall collect, record, and retain the following information when it conducts evaluations to determine that the changed emissions unit will satisfy the Air Toxic Policy:"

a. a description of the parameters changed(composition of materials, new pollutants emitted, change in stack/exhaust parameters, etc.);

b. documentation of it's evaluation and determination that the changed emissions unit still satisfies the "Air Toxic Policy"; and

c. when the computer modeling is performed, a copy of the resulting computer model runs that show the results of the application of the "Air Toxic Policy" for the change.

D. Reporting Requirements

1. The permittee shall submit quarterly deviation (excursion) reports to the Hamilton County Department of Environmental Services that identify all periods of time during which the following scrubber parameters were not maintained within the requirements of the Operational Restrictions:

   a. the scrubber water recirculation flow rate; and

   b. the scrubber solution pH.

   If no exceedances occurred during the reporting period then a report is required stating so. These reports shall be submitted by January 31, April 30, July 31, and October 31 of each year and shall cover the previous calendar quarters.

2. The permittee shall notify the Hamilton County Department of Environmental Services of any exceedance of the HAP emissions limitations set forth in term A.2.b. The reports shall be submitted to the Director (the Hamilton County Department of Environmental Services) by January 31, April 30, July 31 and October 31 of each year and shall cover the previous three calendar months (October through December, January through March, April through June and July through September, respectively.)

   If no exceedances occurred, the permittee shall state so in the report.

E. Testing Requirements

1. Emissions Limitations

   The hydrochloric acid (HCl) emissions shall not exceed 0.001 pound per hour (lb/hr)
   The hydrochloric acid (HCl) emissions shall not exceed 0.002 Tons per Year (TPY)

   Applicable Compliance Methods

Compliance with the hourly HCl emissions limitation shall be determined by the following calculations:

a. for the conversion of TCS to HCl in the scrubber:

actual trichlorosilane usage (lbs TCS/hr) x unit conversion trichlorosilane (1 mole TCS/135.4524 gMW TCS) x stoichiometric ratio (3 moles HCl/1 mole TCS) x unit conversion HCl (36.3609 gMW HCL/1 mole HCl) = lbs HCl/hr

b. for the addition of HCl in the hi-etch process:

actual cycle time (min/cycle) x actual production rate (cycles/hr) x actual flow rate (liters HCl/hr) x conversion factor (ft3/28.3168 liters) x conversion factor (1 lb HCl/9.7752 ft3 HCl) = lbs HCl/hr; and

c. (lbs HCl/hr from the conversion of TCS + lbs HCl/hr from the addition of HCl) x scrubber efficiency (1 - 99.5/100) = lbs HCl/hr from the scrubber stack

Compliance with the annual HCl emissions limitation shall be determined by the recordkeeping requirement in T&C C.2.h.

2. Emissions Limitation

Visible particulate emissions from any stack associated with emissions unit P063 shall not exceed 20 percent opacity, as a six-minute average, except as specified by rule

Applicable Compliance Method

Compliance shall be determined in accordance with Test Method 9 as set forth in "Appendix on Test Methods" in 40 CFR, Part 60 ("Standards of Performance for New Stationary Sources"), as such Appendix existed on July 1, 1996.

3. Emissions Limitations

9.9 TPY for any single HAP and 24.9 TPY for any combination of HAPs

Compliance with the HAPs emissions limits outlined in T&C A.2.b. shall be demonstrated by the recordkeeping requirements in T&C C.2.

4. Compliance with the operational restrictions for the wet scrubber in T&Cs B.1. and B.2. shall be demonstrated by the recordkeeping requirements in T&C C.1.

F. Miscellaneous Requirements

1. The following terms and conditions of this permit are federally enforceable: A, B, C.1, C.2, D and E.

PART II - SPECIAL TERMS AND CONDITIONS FOR SPECIFIC EMISSIONS UNIT(S)

A. Applicable Emissions Limitations and/or Control Requirements

1. The specific operations(s), property, and/or equipment which constitute this emissions unit are listed in the following table along with the applicable rules and/or requirements and with the applicable emissions limitations and/or control measures. Emissions from this unit shall not exceed the listed limitations, and the listed control measures shall be specified in narrative form following the table.

Operations, Property, and/or Equipment	Applicable Rules/Requirements	
P064 - B18 - AMT Barrel Reactor; CS-2 - Plant-wide condenser, scrubber, and hydrogen recovery unit	OAC rule 3745-31-05(A)(3)	OAC rule 3745-17-11(B)
	OAC rule 3745-31-05(C) (to avoid being subject to OAC rules 3745-31-28 and Title V permitting requirements)	
	OAC rule 3745-17-07(A)(1)	

Applicable Emissions Limitations/Control Measures
The hydrochloric acid (HCl) emissions shall not exceed 0.001 pound per hour (lb/hr).
The hydrochloric acid (HCl) emissions shall not exceed 0.002 Tons per Year (TPY).
See T&C A.2.c.
The requirements of this rule also include compliance with the requirements of OAC rule 3745-31-05(C) and OAC rule 3745-17-07(A)(1).
See T&C A.2.b.
Visible particulate emissions from any stack associated with emissions unit P064 shall not exceed 20 percent opacity, as a six-minute average, except as specified by rule.
The emission limitation specified by this rule is less stringent than the emission limitation established pursuant to OAC rule 3745-31-05(A)(3).

2. Additional Terms and Conditions

2.a The hourly emission limitations outlined in term A.1. are based upon the emissions unit's potential to emit. Therefore, no hourly records are required to demonstrate compliance

with these limits.

2.b The actual emissions of Hazardous Air Pollutants (HAPs), as identified in Section 112(b) of Title III of the Clean Air Act, from this facility shall not exceed 9.9 TPY for any single HAP and 24.9 TPY for any combination of HAPs. Compliance with the above limitations shall be based on a rolling, 12-month summation. The permittee has existing records to demonstrate compliance with these limits upon issuance of this permit.

2.c Compliance with OAC rule 3745-31-05(A)(3) shall be demonstrated by the use of a wet scrubber, compliance with the HCl emissions limits and compliance with the facility-wide HAPs emissions limits.

B. Operational Restrictions

1. The scrubber water recirculation flow rate shall be continuously maintained at a value of not less than 60 gallons per minute at all times while the emissions unit is in operation.

2. The pH of the scrubbing liquor shall be maintained within the range of 8-13 at all times while the emissions unit is in operation.

C. Monitoring and/or Recordkeeping Requirements

1. The permittee shall properly install, operate and maintain equipment to continuously monitor the scrubber water recirculation flow rate into the scrubber and the pH of the scrubber liquor while the emissions unit is in operation. The monitoring devices and any recorders shall be installed, calibrated, operated and maintained in accordance with the manufacturer's recommendations, instructions and operating manuals.

   The permittee shall collect and record the following information each day:

   a. the scrubber water recirculation flow rate, in gallons per minute, on a once per day basis;

   b. the pH of the scrubber liquor, on a once per day basis; and

   c. the operating times for the capture (collection) system, control device, monitoring equipment, and the associated emissions unit.

2. The permittee shall collect and record the following information each month for the entire facility:

   a. for all epitaxial reactors, the amount of hydrogen chloride (HCl) used (input), in pounds;

   b. for all epitaxial reactors, the amount of HCl released from the reaction of trichlorosilane,

in pounds;

c. for all epitaxial reactors, the amount of controlled emissions of each HAP, in tons;

d. for all emissions units, the amount of any other material used which contains HAPs, in tons;

e. for all emissions units, the individual HAP content for each HAP of each material used, in percent by weight (ton HAP/ton material);

f. the total individual HAP emissions for each HAP from all materials employed, in tons per month [for each HAP the sum of c. plus (d. times e.)];

g. the total combined HAP emissions from all materials employed, in tons per month (the sum of all HAPs as calculated in f.);

h. the updated rolling, 12-month summation of each individual HAP emissions, in pounds or tons. This shall include the information for the current month and the preceding eleven calender months ; and

i. the updated rolling, 12-month summation of total combined HAP emissions, in pounds or tons. This shall include the information for the current month and the preceding eleven calender months.

* A listing of the HAPs can be found in Section 112(b) of the Clean Air Act or can be obtained by contacting your Hamilton County Department of Environmental Services contact. This information does not have to be kept on a individual emissions unit basis.

3. The permit to install for emissions units P024 - P035 and P051 - P074 was evaluated based on the actual materials (typically coatings and cleanup materials) and the design parameters of the emissions unit's exhaust systems, as specified by the permittee in the permit to install application. The Ohio EPA's "Review of New Sources of Air Toxic Emissions" policy ("Air Toxic Policy") was applied for each pollutant emitted by this emissions unit using data from the permit to install application and the SCREEN 3.0 model (or other Ohio EPA approved model). The predicted 1-hour maximum ground-level concentration from the use of the SCREEN 3.0 model was compared to the Maximum Ground-Level Concentration (MAGLC).

The following summarizes the results of the modeling for the "worst case" pollutant(s):

Pollutant: HCl (CAS 7647-01-0)

TLV (ug/m^3): 2198

Maximum Hourly Emission Rate (lbs/hr): 0.132 lbs/hr HCl, P024 - P035 and P051 - P074, combined

Predicted 1-Hour Maximum Ground-Level Concentration (ug/m^3): 30.68 Ug/m^3, P024 - P035 and P051 - P074, combined

MAGLC (ug/m^3): 52.33

Physical changes to or in the method of operation of the emissions unit after it's installation or modification could affect the parameters used to determine whether or not the "Air Toxics Policy" is satisfied. Consequently, prior to making a change that could impact such parameters, the permittee shall conduct an evaluation to determine that the "Air Toxic Policy" will still be satisfied. If, upon evaluation, the permittee determines that the "Air Toxic Policy" will not be satisfied, the permittee will not make the change. Changes that can affect the parameters used in the "Air Toxic Policy" include the following:

a. changes in the composition of the materials used (typically for coatings or cleanup materials), or the use of new materials, that would result in the emission of a compound with a lower Threshold Limit Value (TLV), as indicated in the most recent version of the handbook entitled "American Conference of Governmental Industrial Hygienists (ACGIH)," than the lowest TLV value previously modeled;

b. changes in the composition of the materials, or use of new materials, that would result in an increase in emissions of any pollutant with a listed TLV that was proposed in the application and modeled; and

c. physical changes to the emissions unit or its exhaust parameters (e.g., increased/decreased exhaust flow, changes in stack height, changes in stack diameter, etc.).

If the permittee determines that the "Air Toxic Policy" will be satisfied for the above changes, the Ohio EPA will not consider the change(s) to be a "modification" under OAC rule 3745-31-01 solely due to the emissions of any type of toxic air contaminant not previously emitted, and a modification of the existing permit to install will not be required, even if the toxic air contaminant emissions are greater than the de minimis level in OAC rule 3745-15-05. If the change(s) is (are) defined as a modification under other provisions of the modification definition, then the permittee shall obtain a final permit to install prior to the change.

The permittee shall collect, record, and retain the following information when it conducts evaluations to determine that the changed emissions unit will satisfy the Air Toxic Policy:"

a. a description of the parameters changed(composition of materials, new pollutants emitted, change in stack/exhaust parameters, etc.);

b. documentation of it's evaluation and determination that the changed emissions unit still satisfies the "Air Toxic Policy"; and

c. when the computer modeling is performed, a copy of the resulting computer model runs that show the results of the application of the "Air Toxic Policy" for the change.

D. Reporting Requirements

1. The permittee shall submit quarterly deviation (excursion) reports to the Hamilton County Department of Environmental Services that identify all periods of time during which the following scrubber parameters were not maintained within the requirements of the Operational Restrictions:

   a. the scrubber water recirculation flow rate; and

   b. the scrubber solution pH.

   If no exceedances occurred during the reporting period then a report is required stating so. These reports shall be submitted by January 31, April 30, July 31, and October 31 of each year and shall cover the previous calendar quarters.

2. The permittee shall notify the Hamilton County Department of Environmental Services of any exceedance of the HAP emissions limitations set forth in term A.2.b. The reports shall be submitted to the Director (the Hamilton County Department of Environmental Services) by January 31, April 30, July 31 and October 31 of each year and shall cover the previous three calendar months (October through December, January through March, April through June and July through September, respectively.)

   If no exceedances occurred, the permittee shall state so in the report.

E. Testing Requirements

1. Emissions Limitations

   The hydrochloric acid (HCl) emissions shall not exceed 0.001 pound per hour (lb/hr)
   The hydrochloric acid (HCl) emissions shall not exceed 0.002 Tons per Year (TPY)

   Applicable Compliance Methods

Compliance with the hourly HCl emissions limitation shall be determined by the following calculations:

a. for the conversion of TCS to HCl in the scrubber:

actual trichlorosilane usage (lbs TCS/hr) x unit conversion trichlorosilane (1 mole TCS/135.4524 gMW TCS) x stoichiometric ratio (3 moles HCl/1 mole TCS) x unit conversion HCl (36.3609 gMW HCL/1 mole HCl) = lbs HCl/hr

b. for the addition of HCl in the hi-etch process:

actual cycle time (min/cycle) x actual production rate (cycles/hr) x actual flow rate (liters HCl/hr) x conversion factor (ft3/28.3168 liters) x conversion factor (1 lb HCl/9.7752 ft3 HCl) = lbs HCl/hr; and

c. (lbs HCl/hr from the conversion of TCS + lbs HCl/hr from the addition of HCl) x scrubber efficiency (1 - 99.5/100) = lbs HCl/hr from the scrubber stack

Compliance with the annual HCl emissions limitation shall be determined by the recordkeeping requirement in T&C C.2.h.

2. Emissions Limitation

Visible particulate emissions from any stack associated with emissions unit P064 shall not exceed 20 percent opacity, as a six-minute average, except as specified by rule

Applicable Compliance Method

Compliance shall be determined in accordance with Test Method 9 as set forth in "Appendix on Test Methods" in 40 CFR, Part 60 ("Standards of Performance for New Stationary Sources"), as such Appendix existed on July 1, 1996.

3. Emissions Limitations

9.9 TPY for any single HAP and 24.9 TPY for any combination of HAPs

Compliance with the HAPs emissions limits outlined in T&C A.2.b. shall be demonstrated by the recordkeeping requirements in T&C C.2.

4. Compliance with the operational restrictions for the wet scrubber in T&Cs B.1. and B.2. shall be demonstrated by the recordkeeping requirements in T&C C.1.

F. Miscellaneous Requirements

1. The following terms and conditions of this permit are federally enforceable: A, B, C.1, C.2, D and E.

PART II - SPECIAL TERMS AND CONDITIONS FOR SPECIFIC EMISSIONS UNIT(S)

A. Applicable Emissions Limitations and/or Control Requirements

1. The specific operations(s), property, and/or equipment which constitute this emissions unit are listed in the following table along with the applicable rules and/or requirements and with the applicable emissions limitations and/or control measures. Emissions from this unit shall not exceed the listed limitations, and the listed control measures shall be specified in narrative form following the table.

Operations, Property, and/or Equipment	Applicable Rules/Requirements	
P065 - B19 - AMT Barrel Reactor; CS-2 Plant-wide condenser, scrubber, and hydrogen recovery unit	OAC rule 3745-31-05(A)(3)	OAC rule 3745-17-11(B)
	OAC rule 3745-31-05(C) (to avoid being subject to OAC rules 3745-31-28 and Title V permitting requirements)	
	OAC rule 3745-17-07(A)(1)	

Applicable Emissions Limitations/Control Measures
The hydrochloric acid (HCl) emissions shall not exceed 0.001 pound per hour (lb/hr).
The hydrochloric acid (HCl) emissions shall not exceed 0.002 Tons per Year (TPY). See T&C A.2.c.
The requirements of this rule also include compliance with the requirements of OAC rule 3745-31-05(C) and OAC rule 3745-17-07(A)(1). See T&C A.2.b.
Visible particulate emissions from any stack associated with emissions unit P065 shall not exceed 20 percent opacity, as a six-minute average, except as specified by rule.
The emission limitation specified by this rule is less stringent than the emission limitation established pursuant to OAC rule 3745-31-05(A)(3).

2. Additional Terms and Conditions

2.a The hourly emission limitations outlined in term A.1. are based upon the emissions unit's potential to emit. Therefore, no hourly records are required to demonstrate compliance

with these limits.

2.b The actual emissions of Hazardous Air Pollutants (HAPs), as identified in Section 112(b) of Title III of the Clean Air Act, from this facility shall not exceed 9.9 TPY for any single HAP and 24.9 TPY for any combination of HAPs. Compliance with the above limitations shall be based on a rolling, 12-month summation. The permittee has existing records to demonstrate compliance with these limits upon issuance of this permit.

2.c Compliance with OAC rule 3745-31-05(A)(3) shall be demonstrated by the use of a wet scrubber, compliance with the HCl emissions limits and compliance with the facility-wide HAPs emissions limits.

B. Operational Restrictions

1. The scrubber water recirculation flow rate shall be continuously maintained at a value of not less than 60 gallons per minute at all times while the emissions unit is in operation.

2. The pH of the scrubbing liquor shall be maintained within the range of 8-13 at all times while the emissions unit is in operation.

C. Monitoring and/or Recordkeeping Requirements

1. The permittee shall properly install, operate and maintain equipment to continuously monitor the scrubber water recirculation flow rate into the scrubber and the pH of the scrubber liquor while the emissions unit is in operation. The monitoring devices and any recorders shall be installed, calibrated, operated and maintained in accordance with the manufacturer's recommendations, instructions and operating manuals.

   The permittee shall collect and record the following information each day:

   a. the scrubber water recirculation flow rate, in gallons per minute, on a once per day basis;

   b. the pH of the scrubber liquor, on a once per day basis; and

   c. the operating times for the capture (collection) system, control device, monitoring equipment, and the associated emissions unit.

2. The permittee shall collect and record the following information each month for the entire facility:

   a. for all epitaxial reactors, the amount of hydrogen chloride (HCl) used (input), in pounds;

   b. for all epitaxial reactors, the amount of HCl released from the reaction of trichlorosilane,

in pounds;

c. for all epitaxial reactors, the amount of controlled emissions of each HAP, in tons;

d. for all emissions units, the amount of any other material used which contains HAPs, in tons;

e. for all emissions units, the individual HAP content for each HAP of each material used, in percent by weight (ton HAP/ton material);

f. the total individual HAP emissions for each HAP from all materials employed, in tons per month [for each HAP the sum of c. plus (d. times e.)];

g. the total combined HAP emissions from all materials employed, in tons per month (the sum of all HAPs as calculated in f.);

h. the updated rolling, 12-month summation of each individual HAP emissions, in pounds or tons. This shall include the information for the current month and the preceding eleven calender months ; and

i. the updated rolling, 12-month summation of total combined HAP emissions, in pounds or tons. This shall include the information for the current month and the preceding eleven calender months.

* A listing of the HAPs can be found in Section 112(b) of the Clean Air Act or can be obtained by contacting your Hamilton County Department of Environmental Services contact. This information does not have to be kept on a individual emissions unit basis.

3. The permit to install for emissions units P024 - P035 and P051 - P074 was evaluated based on the actual materials (typically coatings and cleanup materials) and the design parameters of the emissions unit's exhaust systems, as specified by the permittee in the permit to install application. The Ohio EPA's "Review of New Sources of Air Toxic Emissions" policy ("Air Toxic Policy") was applied for each pollutant emitted by this emissions unit using data from the permit to install application and the SCREEN 3.0 model (or other Ohio EPA approved model). The predicted 1-hour maximum ground-level concentration from the use of the SCREEN 3.0 model was compared to the Maximum Ground-Level Concentration (MAGLC).

The following summarizes the results of the modeling for the "worst case" pollutant(s):

Pollutant: HCl (CAS 7647-01-0)

TLV (ug/m^3): 2198

Maximum Hourly Emission Rate (lbs/hr): 0.132 lbs/hr HCl, P024 - P035 and P051 - P074, combined

Predicted 1-Hour Maximum Ground-Level Concentration (ug/m^3): 30.68 Ug/m^3, P024 - P035 and P051 - P074, combined

MAGLC (ug/m^3): 52.33

Physical changes to or in the method of operation of the emissions unit after it's installation or modification could affect the parameters used to determine whether or not the "Air Toxics Policy" is satisfied. Consequently, prior to making a change that could impact such parameters, the permittee shall conduct an evaluation to determine that the "Air Toxic Policy" will still be satisfied. If, upon evaluation, the permittee determines that the "Air Toxic Policy" will not be satisfied, the permittee will not make the change. Changes that can affect the parameters used in the "Air Toxic Policy" include the following:

a. changes in the composition of the materials used (typically for coatings or cleanup materials), or the use of new materials, that would result in the emission of a compound with a lower Threshold Limit Value (TLV), as indicated in the most recent version of the handbook entitled "American Conference of Governmental Industrial Hygienists (ACGIH)," than the lowest TLV value previously modeled;

b. changes in the composition of the materials, or use of new materials, that would result in an increase in emissions of any pollutant with a listed TLV that was proposed in the application and modeled; and

c. physical changes to the emissions unit or its exhaust parameters (e.g., increased/decreased exhaust flow, changes in stack height, changes in stack diameter, etc.).

If the permittee determines that the "Air Toxic Policy" will be satisfied for the above changes, the Ohio EPA will not consider the change(s) to be a "modification" under OAC rule 3745-31-01 solely due to the emissions of any type of toxic air contaminant not previously emitted, and a modification of the existing permit to install will not be required, even if the toxic air contaminant emissions are greater than the de minimis level in OAC rule 3745-15-05. If the change(s) is (are) defined as a modification under other provisions of the modification definition, then the permittee shall obtain a final permit to install prior to the change.

The permittee shall collect, record, and retain the following information when it conducts evaluations to determine that the changed emissions unit will satisfy the Air Toxic Policy:"

a. a description of the parameters changed(composition of materials, new pollutants emitted, change in stack/exhaust parameters, etc.);

b. documentation of it's evaluation and determination that the changed emissions unit still satisfies the "Air Toxic Policy"; and

c. when the computer modeling is performed, a copy of the resulting computer model runs that show the results of the application of the "Air Toxic Policy" for the change.

D. Reporting Requirements

1. The permittee shall submit quarterly deviation (excursion) reports to the Hamilton County Department of Environmental Services that identify all periods of time during which the following scrubber parameters were not maintained within the requirements of the Operational Restrictions:

   a. the scrubber water recirculation flow rate; and

   b. the scrubber solution pH.

   If no exceedances occurred during the reporting period then a report is required stating so. These reports shall be submitted by January 31, April 30, July 31, and October 31 of each year and shall cover the previous calendar quarters.

2. The permittee shall notify the Hamilton County Department of Environmental Services of any exceedance of the HAP emissions limitations set forth in term A.2.b. The reports shall be submitted to the Director (the Hamilton County Department of Environmental Services) by January 31, April 30, July 31 and October 31 of each year and shall cover the previous three calendar months (October through December, January through March, April through June and July through September, respectively.)

   If no exceedances occurred, the permittee shall state so in the report.

E. Testing Requirements

1. Emissions Limitations

   The hydrochloric acid (HCl) emissions shall not exceed 0.001 pound per hour (lb/hr)
   The hydrochloric acid (HCl) emissions shall not exceed 0.002 Tons per Year (TPY)

   Applicable Compliance Methods

Compliance with the hourly HCl emissions limitation shall be determined by the following calculations:

a. for the conversion of TCS to HCl in the scrubber:

actual trichlorosilane usage (lbs TCS/hr) x unit conversion trichlorosilane (1 mole TCS/135.4524 gMW TCS) x stoichiometric ratio (3 moles HCl/1 mole TCS) x unit conversion HCl (36.3609 gMW HCL/1 mole HCl) = lbs HCl/hr

b. for the addition of HCl in the hi-etch process:

actual cycle time (min/cycle) x actual production rate (cycles/hr) x actual flow rate (liters HCl/hr) x conversion factor (ft3/28.3168 liters) x conversion factor (1 lb HCl/9.7752 ft3 HCl) = lbs HCl/hr; and

c. (lbs HCl/hr from the conversion of TCS + lbs HCl/hr from the addition of HCl) x scrubber efficiency (1 - 99.5/100) = lbs HCl/hr from the scrubber stack

Compliance with the annual HCl emissions limitation shall be determined by the recordkeeping requirement in T&C C.2.h.

2. Emissions Limitation

Visible particulate emissions from any stack associated with emissions unit P065 shall not exceed 20 percent opacity, as a six-minute average, except as specified by rule

Applicable Compliance Method

Compliance shall be determined in accordance with Test Method 9 as set forth in "Appendix on Test Methods" in 40 CFR, Part 60 ("Standards of Performance for New Stationary Sources"), as such Appendix existed on July 1, 1996.

3. Emissions Limitations

9.9 TPY for any single HAP and 24.9 TPY for any combination of HAPs

Compliance with the HAPs emissions limits outlined in T&C A.2.b. shall be demonstrated by the recordkeeping requirements in T&C C.2.

4. Compliance with the operational restrictions for the wet scrubber in T&Cs B.1. and B.2. shall be demonstrated by the recordkeeping requirements in T&C C.1.

F. Miscellaneous Requirements

1. The following terms and conditions of this permit are federally enforceable: A, B, C.1, C.2, D and E.

PART II - SPECIAL TERMS AND CONDITIONS FOR SPECIFIC EMISSIONS UNIT(S)

A. Applicable Emissions Limitations and/or Control Requirements

1. The specific operations(s), property, and/or equipment which constitute this emissions unit are listed in the following table along with the applicable rules and/or requirements and with the applicable emissions limitations and/or control measures. Emissions from this unit shall not exceed the listed limitations, and the listed control measures shall be specified in narrative form following the table.

Operations, Property, and/or Equipment	Applicable Rules/Requirements	
P066 - B20 - AMT Barrel Reactor; CS-2 - Plant-wide condenser, scrubber, and hydrogen recovery unit	OAC rule 3745-31-05(A)(3)	OAC rule 3745-17-11(B)
	OAC rule 3745-31-05(C) (to avoid being subject to OAC rules 3745-31-28 and Title V permitting requirements)	
	OAC rule 3745-17-07(A)(1)	

Applicable Emissions Limitations/Control Measures
The hydrochloric acid (HCl) emissions shall not exceed 0.001 pound per hour (lb/hr).
The hydrochloric acid (HCl) emissions shall not exceed 0.002 Tons per Year (TPY). See T&C A.2.c.
The requirements of this rule also include compliance with the requirements of OAC rule 3745-31-05(C) and OAC rule 3745-17-07(A)(1). See T&C A.2.b.
Visible particulate emissions from any stack associated with emissions unit P066 shall not exceed 20 percent opacity, as a six-minute average, except as specified by rule.
The emission limitation specified by this rule is less stringent than the emission limitation established pursuant to OAC rule 3745-31-05(A)(3).

2. Additional Terms and Conditions

2.a The hourly emission limitations outlined in term A.1. are based upon the emissions unit's potential to emit. Therefore, no hourly records are required to demonstrate compliance

with these limits.

2.b The actual emissions of Hazardous Air Pollutants (HAPs), as identified in Section 112(b) of Title III of the Clean Air Act, from this facility shall not exceed 9.9 TPY for any single HAP and 24.9 TPY for any combination of HAPs. Compliance with the above limitations shall be based on a rolling, 12-month summation. The permittee has existing records to demonstrate compliance with these limits upon issuance of this permit.

2.c Compliance with OAC rule 3745-31-05(A)(3) shall be demonstrated by the use of a wet scrubber, compliance with the HCl emissions limits and compliance with the facility-wide HAPs emissions limits.

B. Operational Restrictions

1. The scrubber water recirculation flow rate shall be continuously maintained at a value of not less than 60 gallons per minute at all times while the emissions unit is in operation.

2. The pH of the scrubbing liquor shall be maintained within the range of 8-13 at all times while the emissions unit is in operation.

C. Monitoring and/or Recordkeeping Requirements

1. The permittee shall properly install, operate and maintain equipment to continuously monitor the scrubber water recirculation flow rate into the scrubber and the pH of the scrubber liquor while the emissions unit is in operation. The monitoring devices and any recorders shall be installed, calibrated, operated and maintained in accordance with the manufacturer's recommendations, instructions and operating manuals.

   The permittee shall collect and record the following information each day:

   a. the scrubber water recirculation flow rate, in gallons per minute, on a once per day basis;

   b. the pH of the scrubber liquor, on a once per day basis; and

   c. the operating times for the capture (collection) system, control device, monitoring equipment, and the associated emissions unit.

2. The permittee shall collect and record the following information each month for the entire facility:

   a. for all epitaxial reactors, the amount of hydrogen chloride (HCl) used (input), in pounds;

   b. for all epitaxial reactors, the amount of HCl released from the reaction of trichlorosilane,

in pounds;

c. for all epitaxial reactors, the amount of controlled emissions of each HAP, in tons;

d. for all emissions units, the amount of any other material used which contains HAPs, in tons;

e. for all emissions units, the individual HAP content for each HAP of each material used, in percent by weight (ton HAP/ton material);

f. the total individual HAP emissions for each HAP from all materials employed, in tons per month [for each HAP the sum of c. plus (d. times e.)];

g. the total combined HAP emissions from all materials employed, in tons per month (the sum of all HAPs as calculated in f.);

h. the updated rolling, 12-month summation of each individual HAP emissions, in pounds or tons. This shall include the information for the current month and the preceding eleven calender months ; and

i. the updated rolling, 12-month summation of total combined HAP emissions, in pounds or tons. This shall include the information for the current month and the preceding eleven calender months.

* A listing of the HAPs can be found in Section 112(b) of the Clean Air Act or can be obtained by contacting your Hamilton County Department of Environmental Services contact. This information does not have to be kept on a individual emissions unit basis.

3. The permit to install for emissions units P024 - P035 and P051 - P074 was evaluated based on the actual materials (typically coatings and cleanup materials) and the design parameters of the emissions unit's exhaust systems, as specified by the permittee in the permit to install application. The Ohio EPA's "Review of New Sources of Air Toxic Emissions" policy ("Air Toxic Policy") was applied for each pollutant emitted by this emissions unit using data from the permit to install application and the SCREEN 3.0 model (or other Ohio EPA approved model). The predicted 1-hour maximum ground-level concentration from the use of the SCREEN 3.0 model was compared to the Maximum Ground-Level Concentration (MAGLC).

The following summarizes the results of the modeling for the "worst case" pollutant(s):

Pollutant: HCl (CAS 7647-01-0)

TLV (ug/m^3): 2198

Maximum Hourly Emission Rate (lbs/hr): 0.132 lbs/hr HCl, P024 - P035 and P051 - P074, combined

Predicted 1-Hour Maximum Ground-Level Concentration (ug/m^3): 30.68 Ug/m^3, P024 - P035 and P051 - P074, combined

MAGLC (ug/m^3): 52.33

Physical changes to or in the method of operation of the emissions unit after it's installation or modification could affect the parameters used to determine whether or not the "Air Toxics Policy" is satisfied. Consequently, prior to making a change that could impact such parameters, the permittee shall conduct an evaluation to determine that the "Air Toxic Policy" will still be satisfied. If, upon evaluation, the permittee determines that the "Air Toxic Policy" will not be satisfied, the permittee will not make the change. Changes that can affect the parameters used in the "Air Toxic Policy" include the following:

a. changes in the composition of the materials used (typically for coatings or cleanup materials), or the use of new materials, that would result in the emission of a compound with a lower Threshold Limit Value (TLV), as indicated in the most recent version of the handbook entitled "American Conference of Governmental Industrial Hygienists (ACGIH)," than the lowest TLV value previously modeled;

b. changes in the composition of the materials, or use of new materials, that would result in an increase in emissions of any pollutant with a listed TLV that was proposed in the application and modeled; and

c. physical changes to the emissions unit or its exhaust parameters (e.g., increased/decreased exhaust flow, changes in stack height, changes in stack diameter, etc.).

If the permittee determines that the "Air Toxic Policy" will be satisfied for the above changes, the Ohio EPA will not consider the change(s) to be a "modification" under OAC rule 3745-31-01 solely due to the emissions of any type of toxic air contaminant not previously emitted, and a modification of the existing permit to install will not be required, even if the toxic air contaminant emissions are greater than the de minimis level in OAC rule 3745-15-05. If the change(s) is (are) defined as a modification under other provisions of the modification definition, then the permittee shall obtain a final permit to install prior to the change.

The permittee shall collect, record, and retain the following information when it conducts evaluations to determine that the changed emissions unit will satisfy the Air Toxic Policy:"

a. a description of the parameters changed(composition of materials, new pollutants emitted, change in stack/exhaust parameters, etc.);

b. documentation of it's evaluation and determination that the changed emissions unit still satisfies the "Air Toxic Policy"; and

c. when the computer modeling is performed, a copy of the resulting computer model runs that show the results of the application of the "Air Toxic Policy" for the change.

D. Reporting Requirements

1. The permittee shall submit quarterly deviation (excursion) reports to the Hamilton County Department of Environmental Services that identify all periods of time during which the following scrubber parameters were not maintained within the requirements of the Operational Restrictions:

   a. the scrubber water recirculation flow rate; and

   b. the scrubber solution pH.

   If no exceedances occurred during the reporting period then a report is required stating so. These reports shall be submitted by January 31, April 30, July 31, and October 31 of each year and shall cover the previous calendar quarters.

2. The permittee shall notify the Hamilton County Department of Environmental Services of any exceedance of the HAP emissions limitations set forth in term A.2.b. The reports shall be submitted to the Director (the Hamilton County Department of Environmental Services) by January 31, April 30, July 31 and October 31 of each year and shall cover the previous three calendar months (October through December, January through March, April through June and July through September, respectively.)

   If no exceedances occurred, the permittee shall state so in the report.

E. Testing Requirements

1. Emissions Limitations

   The hydrochloric acid (HCl) emissions shall not exceed 0.001 pound per hour (lb/hr)
   The hydrochloric acid (HCl) emissions shall not exceed 0.002 Tons per Year (TPY)

   Applicable Compliance Methods

Compliance with the hourly HCl emissions limitation shall be determined by the following calculations:

a. for the conversion of TCS to HCl in the scrubber:

actual trichlorosilane usage (lbs TCS/hr) x unit conversion trichlorosilane (1 mole TCS/135.4524 gMW TCS) x stoichiometric ratio (3 moles HCl/1 mole TCS) x unit conversion HCl (36.3609 gMW HCL/1 mole HCl) = lbs HCl/hr

b. for the addition of HCl in the hi-etch process:

actual cycle time (min/cycle) x actual production rate (cycles/hr) x actual flow rate (liters HCl/hr) x conversion factor (ft3/28.3168 liters) x conversion factor (1 lb HCl/9.7752 ft3 HCl) = lbs HCl/hr; and

c. (lbs HCl/hr from the conversion of TCS + lbs HCl/hr from the addition of HCl) x scrubber efficiency (1 - 99.5/100) = lbs HCl/hr from the scrubber stack

Compliance with the annual HCl emissions limitation shall be determined by the recordkeeping requirement in T&C C.2.h.

2. Emissions Limitation

Visible particulate emissions from any stack associated with emissions unit P066 shall not exceed 20 percent opacity, as a six-minute average, except as specified by rule

Applicable Compliance Method

Compliance shall be determined in accordance with Test Method 9 as set forth in "Appendix on Test Methods" in 40 CFR, Part 60 ("Standards of Performance for New Stationary Sources"), as such Appendix existed on July 1, 1996.

3. Emissions Limitations

9.9 TPY for any single HAP and 24.9 TPY for any combination of HAPs

Compliance with the HAPs emissions limits outlined in T&C A.2.b. shall be demonstrated by the recordkeeping requirements in T&C C.2.

4. Compliance with the operational restrictions for the wet scrubber in T&Cs B.1. and B.2. shall be demonstrated by the recordkeeping requirements in T&C C.1.

F. Miscellaneous Requirements

1. The following terms and conditions of this permit are federally enforceable: A, B, C.1, C.2, D and E.

PART II - SPECIAL TERMS AND CONDITIONS FOR SPECIFIC EMISSIONS UNIT(S)

A. Applicable Emissions Limitations and/or Control Requirements

1. The specific operations(s), property, and/or equipment which constitute this emissions unit are listed in the following table along with the applicable rules and/or requirements and with the applicable emissions limitations and/or control measures. Emissions from this unit shall not exceed the listed limitations, and the listed control measures shall be specified in narrative form following the table.

Operations, Property, and/or Equipment	Applicable Rules/Requirements	
P067 - B21 - AMT Barrel Reactor; CS-2 - Plant-wide condenser, scrubber, and hydrogen recovery unit	OAC rule 3745-31-05(A)(3)	OAC rule 3745-17-11(B)
	OAC rule 3745-31-05(C) (to avoid being subject to OAC rules 3745-31-28 and Title V permitting requirements)	
	OAC rule 3745-17-07(A)(1)	

Applicable Emissions Limitations/Control Measures
The hydrochloric acid (HCl) emissions shall not exceed 0.001 pound per hour (lb/hr).
The hydrochloric acid (HCl) emissions shall not exceed 0.002 Tons per Year (TPY).
See T&C A.2.c.
The requirements of this rule also include compliance with the requirements of OAC rule 3745-31-05(C) and OAC rule 3745-17-07(A)(1).
See T&C A.2.b.
Visible particulate emissions from any stack associated with emissions unit P067 shall not exceed 20 percent opacity, as a six-minute average, except as specified by rule.
The emission limitation specified by this rule is less stringent than the emission limitation established pursuant to OAC rule 3745-31-05(A)(3).

2. Additional Terms and Conditions

2.a The hourly emission limitations outlined in term A.1. are based upon the emissions unit's potential to emit. Therefore, no hourly records are required to demonstrate compliance

with these limits.

2.b The actual emissions of Hazardous Air Pollutants (HAPs), as identified in Section 112(b) of Title III of the Clean Air Act, from this facility shall not exceed 9.9 TPY for any single HAP and 24.9 TPY for any combination of HAPs. Compliance with the above limitations shall be based on a rolling, 12-month summation. The permittee has existing records to demonstrate compliance with these limits upon issuance of this permit.

2.c Compliance with OAC rule 3745-31-05(A)(3) shall be demonstrated by the use of a wet scrubber, compliance with the HCl emissions limits and compliance with the facility-wide HAPs emissions limits.

B. Operational Restrictions

1. The scrubber water recirculation flow rate shall be continuously maintained at a value of not less than 60 gallons per minute at all times while the emissions unit is in operation.

2. The pH of the scrubbing liquor shall be maintained within the range of 8-13 at all times while the emissions unit is in operation.

C. Monitoring and/or Recordkeeping Requirements

1. The permittee shall properly install, operate and maintain equipment to continuously monitor the scrubber water recirculation flow rate into the scrubber and the pH of the scrubber liquor while the emissions unit is in operation. The monitoring devices and any recorders shall be installed, calibrated, operated and maintained in accordance with the manufacturer's recommendations, instructions and operating manuals.

   The permittee shall collect and record the following information each day:

   a. the scrubber water recirculation flow rate, in gallons per minute, on a once per day basis;

   b. the pH of the scrubber liquor, on a once per day basis; and

   c. the operating times for the capture (collection) system, control device, monitoring equipment, and the associated emissions unit.

2. The permittee shall collect and record the following information each month for the entire facility:

   a. for all epitaxial reactors, the amount of hydrogen chloride (HCl) used (input), in pounds;

   b. for all epitaxial reactors, the amount of HCl released from the reaction of trichlorosilane,

in pounds;

c. for all epitaxial reactors, the amount of controlled emissions of each HAP, in tons;

d. for all emissions units, the amount of any other material used which contains HAPs, in tons;

e. for all emissions units, the individual HAP content for each HAP of each material used, in percent by weight (ton HAP/ton material);

f. the total individual HAP emissions for each HAP from all materials employed, in tons per month [for each HAP the sum of c. plus (d. times e.)];

g. the total combined HAP emissions from all materials employed, in tons per month (the sum of all HAPs as calculated in f.);

h. the updated rolling, 12-month summation of each individual HAP emissions, in pounds or tons. This shall include the information for the current month and the preceding eleven calender months ; and

i. the updated rolling, 12-month summation of total combined HAP emissions, in pounds or tons. This shall include the information for the current month and the preceding eleven calender months.

* A listing of the HAPs can be found in Section 112(b) of the Clean Air Act or can be obtained by contacting your Hamilton County Department of Environmental Services contact. This information does not have to be kept on a individual emissions unit basis.

3. The permit to install for emissions units P024 - P035 and P051 - P074 was evaluated based on the actual materials (typically coatings and cleanup materials) and the design parameters of the emissions unit's exhaust systems, as specified by the permittee in the permit to install application. The Ohio EPA's "Review of New Sources of Air Toxic Emissions" policy ("Air Toxic Policy") was applied for each pollutant emitted by this emissions unit using data from the permit to install application and the SCREEN 3.0 model (or other Ohio EPA approved model). The predicted 1-hour maximum ground-level concentration from the use of the SCREEN 3.0 model was compared to the Maximum Ground-Level Concentration (MAGLC).

The following summarizes the results of the modeling for the "worst case" pollutant(s):

Pollutant: HCl (CAS 7647-01-0)

TLV (ug/m^3): 2198

Maximum Hourly Emission Rate (lbs/hr): 0.132 lbs/hr HCl, P024 - P035 and P051 - P074, combined

Predicted 1-Hour Maximum Ground-Level Concentration (ug/m^3): 30.68 Ug/m^3, P024 - P035 and P051 - P074, combined

MAGLC (ug/m^3): 52.33

Physical changes to or in the method of operation of the emissions unit after it's installation or modification could affect the parameters used to determine whether or not the "Air Toxics Policy" is satisfied. Consequently, prior to making a change that could impact such parameters, the permittee shall conduct an evaluation to determine that the "Air Toxic Policy" will still be satisfied. If, upon evaluation, the permittee determines that the "Air Toxic Policy" will not be satisfied, the permittee will not make the change. Changes that can affect the parameters used in the "Air Toxic Policy" include the following:

a. changes in the composition of the materials used (typically for coatings or cleanup materials), or the use of new materials, that would result in the emission of a compound with a lower Threshold Limit Value (TLV), as indicated in the most recent version of the handbook entitled "American Conference of Governmental Industrial Hygienists (ACGIH)," than the lowest TLV value previously modeled;

b. changes in the composition of the materials, or use of new materials, that would result in an increase in emissions of any pollutant with a listed TLV that was proposed in the application and modeled; and

c. physical changes to the emissions unit or its exhaust parameters (e.g., increased/decreased exhaust flow, changes in stack height, changes in stack diameter, etc.).

If the permittee determines that the "Air Toxic Policy" will be satisfied for the above changes, the Ohio EPA will not consider the change(s) to be a "modification" under OAC rule 3745-31-01 solely due to the emissions of any type of toxic air contaminant not previously emitted, and a modification of the existing permit to install will not be required, even if the toxic air contaminant emissions are greater than the de minimis level in OAC rule 3745-15-05. If the change(s) is (are) defined as a modification under other provisions of the modification definition, then the permittee shall obtain a final permit to install prior to the change.

The permittee shall collect, record, and retain the following information when it conducts evaluations to determine that the changed emissions unit will satisfy the Air Toxic Policy:"

a. a description of the parameters changed(composition of materials, new pollutants emitted, change in stack/exhaust parameters, etc.);

b. documentation of it's evaluation and determination that the changed emissions unit still satisfies the "Air Toxic Policy"; and

c. when the computer modeling is performed, a copy of the resulting computer model runs that show the results of the application of the "Air Toxic Policy" for the change.

D. Reporting Requirements

1. The permittee shall submit quarterly deviation (excursion) reports to the Hamilton County Department of Environmental Services that identify all periods of time during which the following scrubber parameters were not maintained within the requirements of the Operational Restrictions:

   a. the scrubber water recirculation flow rate; and

   b. the scrubber solution pH.

   If no exceedances occurred during the reporting period then a report is required stating so. These reports shall be submitted by January 31, April 30, July 31, and October 31 of each year and shall cover the previous calendar quarters.

2. The permittee shall notify the Hamilton County Department of Environmental Services of any exceedance of the HAP emissions limitations set forth in term A.2.b. The reports shall be submitted to the Director (the Hamilton County Department of Environmental Services) by January 31, April 30, July 31 and October 31 of each year and shall cover the previous three calendar months (October through December, January through March, April through June and July through September, respectively.)

   If no exceedances occurred, the permittee shall state so in the report.

E. Testing Requirements

1. Emissions Limitations

   The hydrochloric acid (HCl) emissions shall not exceed 0.001 pound per hour (lb/hr)
   The hydrochloric acid (HCl) emissions shall not exceed 0.002 Tons per Year (TPY)

   Applicable Compliance Methods

Compliance with the hourly HCl emissions limitation shall be determined by the following calculations:

a. for the conversion of TCS to HCl in the scrubber:

actual trichlorosilane usage (lbs TCS/hr) x unit conversion trichlorosilane (1 mole TCS/135.4524 gMW TCS) x stoichiometric ratio (3 moles HCl/1 mole TCS) x unit conversion HCl (36.3609 gMW HCL/1 mole HCl) = lbs HCl/hr

b. for the addition of HCl in the hi-etch process:

actual cycle time (min/cycle) x actual production rate (cycles/hr) x actual flow rate (liters HCl/hr) x conversion factor (ft3/28.3168 liters) x conversion factor (1 lb HCl/9.7752 ft3 HCl) = lbs HCl/hr; and

c. (lbs HCl/hr from the conversion of TCS + lbs HCl/hr from the addition of HCl) x scrubber efficiency (1 - 99.5/100) = lbs HCl/hr from the scrubber stack

Compliance with the annual HCl emissions limitation shall be determined by the recordkeeping requirement in T&C C.2.h.

2. Emissions Limitation

Visible particulate emissions from any stack associated with emissions unit P067 shall not exceed 20 percent opacity, as a six-minute average, except as specified by rule

Applicable Compliance Method

Compliance shall be determined in accordance with Test Method 9 as set forth in "Appendix on Test Methods" in 40 CFR, Part 60 ("Standards of Performance for New Stationary Sources"), as such Appendix existed on July 1, 1996.

3. Emissions Limitations

9.9 TPY for any single HAP and 24.9 TPY for any combination of HAPs

Compliance with the HAPs emissions limits outlined in T&C A.2.b. shall be demonstrated by the recordkeeping requirements in T&C C.2.

4. Compliance with the operational restrictions for the wet scrubber in T&Cs B.1. and B.2. shall be demonstrated by the recordkeeping requirements in T&C C.1.

F. Miscellaneous Requirements

1. The following terms and conditions of this permit are federally enforceable: A, B, C.1, C.2, D and E.

PART II - SPECIAL TERMS AND CONDITIONS FOR SPECIFIC EMISSIONS UNIT(S)

A. Applicable Emissions Limitations and/or Control Requirements

1. The specific operations(s), property, and/or equipment which constitute this emissions unit are listed in the following table along with the applicable rules and/or requirements and with the applicable emissions limitations and/or control measures. Emissions from this unit shall not exceed the listed limitations, and the listed control measures shall be specified in narrative form following the table.

Operations, Property, and/or Equipment	Applicable Rules/Requirements	
P068 - B22 - AMT Barrel Reactor; CS-2 - Plant-wide condenser, scrubber, and hydrogen recovery unit	OAC rule 3745-31-05(A)(3)	OAC rule 3745-17-11(B)
	OAC rule 3745-31-05(C) (to avoid being subject to OAC rules 3745-31-28 and Title V permitting requirements)	
	OAC rule 3745-17-07(A)(1)	

Applicable Emissions Limitations/Control Measures	
The hydrochloric acid (HCl) emissions shall not exceed 0.001 pound per hour (lb/hr).	
The hydrochloric acid (HCl) emissions shall not exceed 0.002 Tons per Year (TPY).	See T&C A.2.c.
The requirements of this rule also include compliance with the requirements of OAC rule 3745-31-05(C) and OAC rule 3745-17-07(A)(1).	See T&C A.2.b.
Visible particulate emissions from any stack associated with emissions unit P068 shall not exceed 20 percent opacity, as a six-minute average, except as specified by rule.	
The emission limitation specified by this rule is less stringent than the emission limitation established pursuant to OAC rule 3745-31-05(A)(3).	

2. Additional Terms and Conditions

2.a The hourly emission limitations outlined in term A.1. are based upon the emissions unit's potential to emit. Therefore, no hourly records are required to demonstrate compliance

with these limits.

2.b The actual emissions of Hazardous Air Pollutants (HAPs), as identified in Section 112(b) of Title III of the Clean Air Act, from this facility shall not exceed 9.9 TPY for any single HAP and 24.9 TPY for any combination of HAPs. Compliance with the above limitations shall be based on a rolling, 12-month summation. The permittee has existing records to demonstrate compliance with these limits upon issuance of this permit.

2.c Compliance with OAC rule 3745-31-05(A)(3) shall be demonstrated by the use of a wet scrubber, compliance with the HCl emissions limits and compliance with the facility-wide HAPs emissions limits.

B. Operational Restrictions

1. The scrubber water recirculation flow rate shall be continuously maintained at a value of not less than 60 gallons per minute at all times while the emissions unit is in operation.

2. The pH of the scrubbing liquor shall be maintained within the range of 8-13 at all times while the emissions unit is in operation.

C. Monitoring and/or Recordkeeping Requirements

1. The permittee shall properly install, operate and maintain equipment to continuously monitor the scrubber water recirculation flow rate into the scrubber and the pH of the scrubber liquor while the emissions unit is in operation. The monitoring devices and any recorders shall be installed, calibrated, operated and maintained in accordance with the manufacturer's recommendations, instructions and operating manuals.

   The permittee shall collect and record the following information each day:

   a. the scrubber water recirculation flow rate, in gallons per minute, on a once per day basis;

   b. the pH of the scrubber liquor, on a once per day basis; and

   c. the operating times for the capture (collection) system, control device, monitoring equipment, and the associated emissions unit.

2. The permittee shall collect and record the following information each month for the entire facility:

   a. for all epitaxial reactors, the amount of hydrogen chloride (HCl) used (input), in pounds;

   b. for all epitaxial reactors, the amount of HCl released from the reaction of trichlorosilane,

in pounds;

c. for all epitaxial reactors, the amount of controlled emissions of each HAP, in tons;

d. for all emissions units, the amount of any other material used which contains HAPs, in tons;

e. for all emissions units, the individual HAP content for each HAP of each material used, in percent by weight (ton HAP/ton material);

f. the total individual HAP emissions for each HAP from all materials employed, in tons per month [for each HAP the sum of c. plus (d. times e.)];

g. the total combined HAP emissions from all materials employed, in tons per month (the sum of all HAPs as calculated in f.);

h. the updated rolling, 12-month summation of each individual HAP emissions, in pounds or tons. This shall include the information for the current month and the preceding eleven calender months ; and

i. the updated rolling, 12-month summation of total combined HAP emissions, in pounds or tons. This shall include the information for the current month and the preceding eleven calender months.

* A listing of the HAPs can be found in Section 112(b) of the Clean Air Act or can be obtained by contacting your Hamilton County Department of Environmental Services contact. This information does not have to be kept on a individual emissions unit basis.

3. The permit to install for emissions units P024 - P035 and P051 - P074 was evaluated based on the actual materials (typically coatings and cleanup materials) and the design parameters of the emissions unit's exhaust systems, as specified by the permittee in the permit to install application. The Ohio EPA's "Review of New Sources of Air Toxic Emissions" policy ("Air Toxic Policy") was applied for each pollutant emitted by this emissions unit using data from the permit to install application and the SCREEN 3.0 model (or other Ohio EPA approved model). The predicted 1-hour maximum ground-level concentration from the use of the SCREEN 3.0 model was compared to the Maximum Ground-Level Concentration (MAGLC).

The following summarizes the results of the modeling for the "worst case" pollutant(s):

Pollutant: HCl (CAS 7647-01-0)

TLV (ug/m^3): 2198

Maximum Hourly Emission Rate (lbs/hr): 0.132 lbs/hr HCl, P024 - P035 and P051 - P074, combined

Predicted 1-Hour Maximum Ground-Level Concentration (ug/m^3): 30.68 Ug/m^3, P024 - P035 and P051 - P074, combined

MAGLC (ug/m^3): 52.33

Physical changes to or in the method of operation of the emissions unit after it's installation or modification could affect the parameters used to determine whether or not the "Air Toxics Policy" is satisfied. Consequently, prior to making a change that could impact such parameters, the permittee shall conduct an evaluation to determine that the "Air Toxic Policy" will still be satisfied. If, upon evaluation, the permittee determines that the "Air Toxic Policy" will not be satisfied, the permittee will not make the change. Changes that can affect the parameters used in the "Air Toxic Policy" include the following:

a. changes in the composition of the materials used (typically for coatings or cleanup materials), or the use of new materials, that would result in the emission of a compound with a lower Threshold Limit Value (TLV), as indicated in the most recent version of the handbook entitled "American Conference of Governmental Industrial Hygienists (ACGIH)," than the lowest TLV value previously modeled;

b. changes in the composition of the materials, or use of new materials, that would result in an increase in emissions of any pollutant with a listed TLV that was proposed in the application and modeled; and

c. physical changes to the emissions unit or its exhaust parameters (e.g., increased/decreased exhaust flow, changes in stack height, changes in stack diameter, etc.).

If the permittee determines that the "Air Toxic Policy" will be satisfied for the above changes, the Ohio EPA will not consider the change(s) to be a "modification" under OAC rule 3745-31-01 solely due to the emissions of any type of toxic air contaminant not previously emitted, and a modification of the existing permit to install will not be required, even if the toxic air contaminant emissions are greater than the de minimis level in OAC rule 3745-15-05. If the change(s) is (are) defined as a modification under other provisions of the modification definition, then the permittee shall obtain a final permit to install prior to the change.

The permittee shall collect, record, and retain the following information when it conducts evaluations to determine that the changed emissions unit will satisfy the Air Toxic Policy:"

a. a description of the parameters changed(composition of materials, new pollutants emitted, change in stack/exhaust parameters, etc.);

b. documentation of it's evaluation and determination that the changed emissions unit still satisfies the "Air Toxic Policy"; and

c. when the computer modeling is performed, a copy of the resulting computer model runs that show the results of the application of the "Air Toxic Policy" for the change.

D. Reporting Requirements

1. The permittee shall submit quarterly deviation (excursion) reports to the Hamilton County Department of Environmental Services that identify all periods of time during which the following scrubber parameters were not maintained within the requirements of the Operational Restrictions:

   a. the scrubber water recirculation flow rate; and

   b. the scrubber solution pH.

   If no exceedances occurred during the reporting period then a report is required stating so. These reports shall be submitted by January 31, April 30, July 31, and October 31 of each year and shall cover the previous calendar quarters.

2. The permittee shall notify the Hamilton County Department of Environmental Services of any exceedance of the HAP emissions limitations set forth in term A.2.b. The reports shall be submitted to the Director (the Hamilton County Department of Environmental Services) by January 31, April 30, July 31 and October 31 of each year and shall cover the previous three calendar months (October through December, January through March, April through June and July through September, respectively.)

   If no exceedances occurred, the permittee shall state so in the report.

E. Testing Requirements

1. Emissions Limitations

   The hydrochloric acid (HCl) emissions shall not exceed 0.001 pound per hour (lb/hr)
   The hydrochloric acid (HCl) emissions shall not exceed 0.002 Tons per Year (TPY)

   Applicable Compliance Methods

Compliance with the hourly HCl emissions limitation shall be determined by the following calculations:

a. for the conversion of TCS to HCl in the scrubber:

actual trichlorosilane usage (lbs TCS/hr) x unit conversion trichlorosilane (1 mole TCS/135.4524 gMW TCS) x stoichiometric ratio (3 moles HCl/1 mole TCS) x unit conversion HCl (36.3609 gMW HCL/1 mole HCl) = lbs HCl/hr

b. for the addition of HCl in the hi-etch process:

actual cycle time (min/cycle) x actual production rate (cycles/hr) x actual flow rate (liters HCl/hr) x conversion factor (ft3/28.3168 liters) x conversion factor (1 lb HCl/9.7752 ft3 HCl) = lbs HCl/hr; and

c. (lbs HCl/hr from the conversion of TCS + lbs HCl/hr from the addition of HCl) x scrubber efficiency (1 - 99.5/100) = lbs HCl/hr from the scrubber stack

Compliance with the annual HCl emissions limitation shall be determined by the recordkeeping requirement in T&C C.2.h.

2. Emissions Limitation

Visible particulate emissions from any stack associated with emissions unit P068 shall not exceed 20 percent opacity, as a six-minute average, except as specified by rule

Applicable Compliance Method

Compliance shall be determined in accordance with Test Method 9 as set forth in "Appendix on Test Methods" in 40 CFR, Part 60 ("Standards of Performance for New Stationary Sources"), as such Appendix existed on July 1, 1996.

3. Emissions Limitations

9.9 TPY for any single HAP and 24.9 TPY for any combination of HAPs

Compliance with the HAPs emissions limits outlined in T&C A.2.b. shall be demonstrated by the recordkeeping requirements in T&C C.2.

4. Compliance with the operational restrictions for the wet scrubber in T&Cs B.1. and B.2. shall be demonstrated by the recordkeeping requirements in T&C C.1.

F. Miscellaneous Requirements

1. The following terms and conditions of this permit are federally enforceable: A, B, C.1, C.2, D and E.

PART II - SPECIAL TERMS AND CONDITIONS FOR SPECIFIC EMISSIONS UNIT(S)

A. Applicable Emissions Limitations and/or Control Requirements

1. The specific operations(s), property, and/or equipment which constitute this emissions unit are listed in the following table along with the applicable rules and/or requirements and with the applicable emissions limitations and/or control measures. Emissions from this unit shall not exceed the listed limitations, and the listed control measures shall be specified in narrative form following the table.

Operations, Property, and/or Equipment	Applicable Rules/Requirements	
P069 - B23 - AMT Barrel Reactor; CS-2 - Plant-wide condenser, scrubber, and hydrogen recovery unit	OAC rule 3745-31-05(A)(3)	OAC rule 3745-17-11(B)
	OAC rule 3745-31-05(C) (to avoid being subject to OAC rules 3745-31-28 and Title V permitting requirements)	
	OAC rule 3745-17-07(A)(1)	

Applicable Emissions Limitations/Control Measures
The hydrochloric acid (HCl) emissions shall not exceed 0.001 pound per hour (lb/hr).
The hydrochloric acid (HCl) emissions shall not exceed 0.002 Tons per Year (TPY). See T&C A.2.c.
The requirements of this rule also include compliance with the requirements of OAC rule 3745-31-05(C) and OAC rule 3745-17-07(A)(1). See T&C A.2.b.
Visible particulate emissions from any stack associated with emissions unit P069 shall not exceed 20 percent opacity, as a six-minute average, except as specified by rule.
The emission limitation specified by this rule is less stringent than the emission limitation established pursuant to OAC rule 3745-31-05(A)(3).

2. Additional Terms and Conditions

2.a The hourly emission limitations outlined in term A.1. are based upon the emissions unit's potential to emit. Therefore, no hourly records are required to demonstrate compliance

with these limits.

2.b The actual emissions of Hazardous Air Pollutants (HAPs), as identified in Section 112(b) of Title III of the Clean Air Act, from this facility shall not exceed 9.9 TPY for any single HAP and 24.9 TPY for any combination of HAPs. Compliance with the above limitations shall be based on a rolling, 12-month summation. The permittee has existing records to demonstrate compliance with these limits upon issuance of this permit.

2.c Compliance with OAC rule 3745-31-05(A)(3) shall be demonstrated by the use of a wet scrubber, compliance with the HCl emissions limits and compliance with the facility-wide HAPs emissions limits.

B. Operational Restrictions

1. The scrubber water recirculation flow rate shall be continuously maintained at a value of not less than 60 gallons per minute at all times while the emissions unit is in operation.

2. The pH of the scrubbing liquor shall be maintained within the range of 8-13 at all times while the emissions unit is in operation.

C. Monitoring and/or Recordkeeping Requirements

1. The permittee shall properly install, operate and maintain equipment to continuously monitor the scrubber water recirculation flow rate into the scrubber and the pH of the scrubber liquor while the emissions unit is in operation. The monitoring devices and any recorders shall be installed, calibrated, operated and maintained in accordance with the manufacturer's recommendations, instructions and operating manuals.

   The permittee shall collect and record the following information each day:

   a. the scrubber water recirculation flow rate, in gallons per minute, on a once per day basis;

   b. the pH of the scrubber liquor, on a once per day basis; and

   c. the operating times for the capture (collection) system, control device, monitoring equipment, and the associated emissions unit.

2. The permittee shall collect and record the following information each month for the entire facility:

   a. for all epitaxial reactors, the amount of hydrogen chloride (HCl) used (input), in pounds;

   b. for all epitaxial reactors, the amount of HCl released from the reaction of trichlorosilane,

in pounds;

c. for all epitaxial reactors, the amount of controlled emissions of each HAP, in tons;

d. for all emissions units, the amount of any other material used which contains HAPs, in tons;

e. for all emissions units, the individual HAP content for each HAP of each material used, in percent by weight (ton HAP/ton material);

f. the total individual HAP emissions for each HAP from all materials employed, in tons per month [for each HAP the sum of c. plus (d. times e.)];

g. the total combined HAP emissions from all materials employed, in tons per month (the sum of all HAPs as calculated in f.);

h. the updated rolling, 12-month summation of each individual HAP emissions, in pounds or tons. This shall include the information for the current month and the preceding eleven calender months ; and

i. the updated rolling, 12-month summation of total combined HAP emissions, in pounds or tons. This shall include the information for the current month and the preceding eleven calender months.

* A listing of the HAPs can be found in Section 112(b) of the Clean Air Act or can be obtained by contacting your Hamilton County Department of Environmental Services contact. This information does not have to be kept on a individual emissions unit basis.

3. The permit to install for emissions units P024 - P035 and P051 - P074 was evaluated based on the actual materials (typically coatings and cleanup materials) and the design parameters of the emissions unit's exhaust systems, as specified by the permittee in the permit to install application. The Ohio EPA's "Review of New Sources of Air Toxic Emissions" policy ("Air Toxic Policy") was applied for each pollutant emitted by this emissions unit using data from the permit to install application and the SCREEN 3.0 model (or other Ohio EPA approved model). The predicted 1-hour maximum ground-level concentration from the use of the SCREEN 3.0 model was compared to the Maximum Ground-Level Concentration (MAGLC).

The following summarizes the results of the modeling for the "worst case" pollutant(s):

Pollutant: HCl (CAS 7647-01-0)

TLV (ug/m^3): 2198

Maximum Hourly Emission Rate (lbs/hr): 0.132 lbs/hr HCl, P024 - P035 and P051 - P074, combined

Predicted 1-Hour Maximum Ground-Level Concentration (ug/m^3): 30.68 Ug/m^3, P024 - P035 and P051 - P074, combined

MAGLC (ug/m^3): 52.33

Physical changes to or in the method of operation of the emissions unit after it's installation or modification could affect the parameters used to determine whether or not the "Air Toxics Policy" is satisfied. Consequently, prior to making a change that could impact such parameters, the permittee shall conduct an evaluation to determine that the "Air Toxic Policy" will still be satisfied. If, upon evaluation, the permittee determines that the "Air Toxic Policy" will not be satisfied, the permittee will not make the change. Changes that can affect the parameters used in the "Air Toxic Policy" include the following:

a. changes in the composition of the materials used (typically for coatings or cleanup materials), or the use of new materials, that would result in the emission of a compound with a lower Threshold Limit Value (TLV), as indicated in the most recent version of the handbook entitled "American Conference of Governmental Industrial Hygienists (ACGIH)," than the lowest TLV value previously modeled;

b. changes in the composition of the materials, or use of new materials, that would result in an increase in emissions of any pollutant with a listed TLV that was proposed in the application and modeled; and

c. physical changes to the emissions unit or its exhaust parameters (e.g., increased/decreased exhaust flow, changes in stack height, changes in stack diameter, etc.).

If the permittee determines that the "Air Toxic Policy" will be satisfied for the above changes, the Ohio EPA will not consider the change(s) to be a "modification" under OAC rule 3745-31-01 solely due to the emissions of any type of toxic air contaminant not previously emitted, and a modification of the existing permit to install will not be required, even if the toxic air contaminant emissions are greater than the de minimis level in OAC rule 3745-15-05. If the change(s) is (are) defined as a modification under other provisions of the modification definition, then the permittee shall obtain a final permit to install prior to the change.

The permittee shall collect, record, and retain the following information when it conducts evaluations to determine that the changed emissions unit will satisfy the Air Toxic Policy:"

a. a description of the parameters changed(composition of materials, new pollutants emitted, change in stack/exhaust parameters, etc.);

b. documentation of it's evaluation and determination that the changed emissions unit still satisfies the "Air Toxic Policy"; and

c. when the computer modeling is performed, a copy of the resulting computer model runs that show the results of the application of the "Air Toxic Policy" for the change.

D. Reporting Requirements

1. The permittee shall submit quarterly deviation (excursion) reports to the Hamilton County Department of Environmental Services that identify all periods of time during which the following scrubber parameters were not maintained within the requirements of the Operational Restrictions:

   a. the scrubber water recirculation flow rate; and

   b. the scrubber solution pH.

   If no exceedances occurred during the reporting period then a report is required stating so. These reports shall be submitted by January 31, April 30, July 31, and October 31 of each year and shall cover the previous calendar quarters.

2. The permittee shall notify the Hamilton County Department of Environmental Services of any exceedance of the HAP emissions limitations set forth in term A.2.b. The reports shall be submitted to the Director (the Hamilton County Department of Environmental Services) by January 31, April 30, July 31 and October 31 of each year and shall cover the previous three calendar months (October through December, January through March, April through June and July through September, respectively.)

   If no exceedances occurred, the permittee shall state so in the report.

E. Testing Requirements

1. Emissions Limitations

   The hydrochloric acid (HCl) emissions shall not exceed 0.001 pound per hour (lb/hr)
   The hydrochloric acid (HCl) emissions shall not exceed 0.002 Tons per Year (TPY)

   Applicable Compliance Methods

Compliance with the hourly HCl emissions limitation shall be determined by the following calculations:

a. for the conversion of TCS to HCl in the scrubber:

actual trichlorosilane usage (lbs TCS/hr) x unit conversion trichlorosilane (1 mole TCS/135.4524 gMW TCS) x stoichiometric ratio (3 moles HCl/1 mole TCS) x unit conversion HCl (36.3609 gMW HCL/1 mole HCl) = lbs HCl/hr

b. for the addition of HCl in the hi-etch process:

actual cycle time (min/cycle) x actual production rate (cycles/hr) x actual flow rate (liters HCl/hr) x conversion factor (ft3/28.3168 liters) x conversion factor (1 lb HCl/9.7752 ft3 HCl) = lbs HCl/hr; and

c. (lbs HCl/hr from the conversion of TCS + lbs HCl/hr from the addition of HCl) x scrubber efficiency (1 - 99.5/100) = lbs HCl/hr from the scrubber stack

Compliance with the annual HCl emissions limitation shall be determined by the recordkeeping requirement in T&C C.2.h.

2. Emissions Limitation

Visible particulate emissions from any stack associated with emissions unit P069 shall not exceed 20 percent opacity, as a six-minute average, except as specified by rule

Applicable Compliance Method

Compliance shall be determined in accordance with Test Method 9 as set forth in "Appendix on Test Methods" in 40 CFR, Part 60 ("Standards of Performance for New Stationary Sources"), as such Appendix existed on July 1, 1996.

3. Emissions Limitations

9.9 TPY for any single HAP and 24.9 TPY for any combination of HAPs

Compliance with the HAPs emissions limits outlined in T&C A.2.b. shall be demonstrated by the recordkeeping requirements in T&C C.2.

4. Compliance with the operational restrictions for the wet scrubber in T&Cs B.1. and B.2. shall be demonstrated by the recordkeeping requirements in T&C C.1.

F. Miscellaneous Requirements

1. The following terms and conditions of this permit are federally enforceable: A, B, C.1, C.2, D and E.

PART II - SPECIAL TERMS AND CONDITIONS FOR SPECIFIC EMISSIONS UNIT(S)

A. Applicable Emissions Limitations and/or Control Requirements

1. The specific operations(s), property, and/or equipment which constitute this emissions unit are listed in the following table along with the applicable rules and/or requirements and with the applicable emissions limitations and/or control measures. Emissions from this unit shall not exceed the listed limitations, and the listed control measures shall be specified in narrative form following the table.

Operations, Property, and/or Equipment	Applicable Rules/Requirements	
P070 - B24 - AMT Barrel Reactor; CS-2 - Plant-wide condenser, scrubber, and hydrogen recovery unit	OAC rule 3745-31-05(A)(3)	OAC rule 3745-17-11(B)
	OAC rule 3745-31-05(C) (to avoid being subject to OAC rules 3745-31-28 and Title V permitting requirements)	
	OAC rule 3745-17-07(A)(1)	

Applicable Emissions Limitations/Control Measures
The hydrochloric acid (HCl) emissions shall not exceed 0.001 pound per hour (lb/hr).
The hydrochloric acid (HCl) emissions shall not exceed 0.002 Tons per Year (TPY). See T&C A.2.c.
The requirements of this rule also include compliance with the requirements of OAC rule 3745-31-05(C) and OAC rule 3745-17-07(A)(1). See T&C A.2.b.
Visible particulate emissions from any stack associated with emissions unit P070 shall not exceed 20 percent opacity, as a six-minute average, except as specified by rule.
The emission limitation specified by this rule is less stringent than the emission limitation established pursuant to OAC rule 3745-31-05(A)(3).

2. Additional Terms and Conditions

2.a The hourly emission limitations outlined in term A.1. are based upon the emissions unit's potential to emit. Therefore, no hourly records are required to demonstrate compliance

with these limits.

2.b The actual emissions of Hazardous Air Pollutants (HAPs), as identified in Section 112(b) of Title III of the Clean Air Act, from this facility shall not exceed 9.9 TPY for any single HAP and 24.9 TPY for any combination of HAPs. Compliance with the above limitations shall be based on a rolling, 12-month summation. The permittee has existing records to demonstrate compliance with these limits upon issuance of this permit.

2.c Compliance with OAC rule 3745-31-05(A)(3) shall be demonstrated by the use of a wet scrubber, compliance with the HCl emissions limits and compliance with the facility-wide HAPs emissions limits.

B. Operational Restrictions

1. The scrubber water recirculation flow rate shall be continuously maintained at a value of not less than 60 gallons per minute at all times while the emissions unit is in operation.

2. The pH of the scrubbing liquor shall be maintained within the range of 8-13 at all times while the emissions unit is in operation.

C. Monitoring and/or Recordkeeping Requirements

1. The permittee shall properly install, operate and maintain equipment to continuously monitor the scrubber water recirculation flow rate into the scrubber and the pH of the scrubber liquor while the emissions unit is in operation. The monitoring devices and any recorders shall be installed, calibrated, operated and maintained in accordance with the manufacturer's recommendations, instructions and operating manuals.

   The permittee shall collect and record the following information each day:

   a. the scrubber water recirculation flow rate, in gallons per minute, on a once per day basis;

   b. the pH of the scrubber liquor, on a once per day basis; and

   c. the operating times for the capture (collection) system, control device, monitoring equipment, and the associated emissions unit.

2. The permittee shall collect and record the following information each month for the entire facility:

   a. for all epitaxial reactors, the amount of hydrogen chloride (HCl) used (input), in pounds;

   b. for all epitaxial reactors, the amount of HCl released from the reaction of trichlorosilane,

in pounds;

c. for all epitaxial reactors, the amount of controlled emissions of each HAP, in tons;

d. for all emissions units, the amount of any other material used which contains HAPs, in tons;

e. for all emissions units, the individual HAP content for each HAP of each material used, in percent by weight (ton HAP/ton material);

f. the total individual HAP emissions for each HAP from all materials employed, in tons per month [for each HAP the sum of c. plus (d. times e.)];

g. the total combined HAP emissions from all materials employed, in tons per month (the sum of all HAPs as calculated in f.);

h. the updated rolling, 12-month summation of each individual HAP emissions, in pounds or tons. This shall include the information for the current month and the preceding eleven calender months ; and

i. the updated rolling, 12-month summation of total combined HAP emissions, in pounds or tons. This shall include the information for the current month and the preceding eleven calender months.

* A listing of the HAPs can be found in Section 112(b) of the Clean Air Act or can be obtained by contacting your Hamilton County Department of Environmental Services contact. This information does not have to be kept on a individual emissions unit basis.

3. The permit to install for emissions units P024 - P035 and P051 - P074 was evaluated based on the actual materials (typically coatings and cleanup materials) and the design parameters of the emissions unit's exhaust systems, as specified by the permittee in the permit to install application. The Ohio EPA's "Review of New Sources of Air Toxic Emissions" policy ("Air Toxic Policy") was applied for each pollutant emitted by this emissions unit using data from the permit to install application and the SCREEN 3.0 model (or other Ohio EPA approved model). The predicted 1-hour maximum ground-level concentration from the use of the SCREEN 3.0 model was compared to the Maximum Ground-Level Concentration (MAGLC).

The following summarizes the results of the modeling for the "worst case" pollutant(s):

Pollutant: HCl (CAS 7647-01-0)

TLV (ug/m^3): 2198

Maximum Hourly Emission Rate (lbs/hr): 0.132 lbs/hr HCl, P024 - P035 and P051 - P074, combined

Predicted 1-Hour Maximum Ground-Level Concentration (ug/m^3): 30.68 Ug/m^3, P024 - P035 and P051 - P074, combined

MAGLC (ug/m^3): 52.33

Physical changes to or in the method of operation of the emissions unit after it's installation or modification could affect the parameters used to determine whether or not the "Air Toxics Policy" is satisfied. Consequently, prior to making a change that could impact such parameters, the permittee shall conduct an evaluation to determine that the "Air Toxic Policy" will still be satisfied. If, upon evaluation, the permittee determines that the "Air Toxic Policy" will not be satisfied, the permittee will not make the change. Changes that can affect the parameters used in the "Air Toxic Policy" include the following:

a. changes in the composition of the materials used (typically for coatings or cleanup materials), or the use of new materials, that would result in the emission of a compound with a lower Threshold Limit Value (TLV), as indicated in the most recent version of the handbook entitled "American Conference of Governmental Industrial Hygienists (ACGIH)," than the lowest TLV value previously modeled;

b. changes in the composition of the materials, or use of new materials, that would result in an increase in emissions of any pollutant with a listed TLV that was proposed in the application and modeled; and

c. physical changes to the emissions unit or its exhaust parameters (e.g., increased/decreased exhaust flow, changes in stack height, changes in stack diameter, etc.).

If the permittee determines that the "Air Toxic Policy" will be satisfied for the above changes, the Ohio EPA will not consider the change(s) to be a "modification" under OAC rule 3745-31-01 solely due to the emissions of any type of toxic air contaminant not previously emitted, and a modification of the existing permit to install will not be required, even if the toxic air contaminant emissions are greater than the de minimis level in OAC rule 3745-15-05. If the change(s) is (are) defined as a modification under other provisions of the modification definition, then the permittee shall obtain a final permit to install prior to the change.

The permittee shall collect, record, and retain the following information when it conducts evaluations to determine that the changed emissions unit will satisfy the Air Toxic Policy:"

a. a description of the parameters changed(composition of materials, new pollutants emitted, change in stack/exhaust parameters, etc.);

b. documentation of it's evaluation and determination that the changed emissions unit still satisfies the "Air Toxic Policy"; and

c. when the computer modeling is performed, a copy of the resulting computer model runs that show the results of the application of the "Air Toxic Policy" for the change.

D. Reporting Requirements

1. The permittee shall submit quarterly deviation (excursion) reports to the Hamilton County Department of Environmental Services that identify all periods of time during which the following scrubber parameters were not maintained within the requirements of the Operational Restrictions:

   a. the scrubber water recirculation flow rate; and

   b. the scrubber solution pH.

   If no exceedances occurred during the reporting period then a report is required stating so. These reports shall be submitted by January 31, April 30, July 31, and October 31 of each year and shall cover the previous calendar quarters.

2. The permittee shall notify the Hamilton County Department of Environmental Services of any exceedance of the HAP emissions limitations set forth in term A.2.b. The reports shall be submitted to the Director (the Hamilton County Department of Environmental Services) by January 31, April 30, July 31 and October 31 of each year and shall cover the previous three calendar months (October through December, January through March, April through June and July through September, respectively.)

   If no exceedances occurred, the permittee shall state so in the report.

E. Testing Requirements

1. Emissions Limitations

   The hydrochloric acid (HCl) emissions shall not exceed 0.001 pound per hour (lb/hr)
   The hydrochloric acid (HCl) emissions shall not exceed 0.002 Tons per Year (TPY)

   Applicable Compliance Methods

Compliance with the hourly HCl emissions limitation shall be determined by the following calculations:

a. for the conversion of TCS to HCl in the scrubber:

actual trichlorosilane usage (lbs TCS/hr) x unit conversion trichlorosilane (1 mole TCS/135.4524 gMW TCS) x stoichiometric ratio (3 moles HCl/1 mole TCS) x unit conversion HCl (36.3609 gMW HCL/1 mole HCl) = lbs HCl/hr

b. for the addition of HCl in the hi-etch process:

actual cycle time (min/cycle) x actual production rate (cycles/hr) x actual flow rate (liters HCl/hr) x conversion factor (ft3/28.3168 liters) x conversion factor (1 lb HCl/9.7752 ft3 HCl) = lbs HCl/hr; and

c. (lbs HCl/hr from the conversion of TCS + lbs HCl/hr from the addition of HCl) x scrubber efficiency (1 - 99.5/100) = lbs HCl/hr from the scrubber stack

Compliance with the annual HCl emissions limitation shall be determined by the recordkeeping requirement in T&C C.2.h.

2. Emissions Limitation

Visible particulate emissions from any stack associated with emissions unit P070 shall not exceed 20 percent opacity, as a six-minute average, except as specified by rule

Applicable Compliance Method

Compliance shall be determined in accordance with Test Method 9 as set forth in "Appendix on Test Methods" in 40 CFR, Part 60 ("Standards of Performance for New Stationary Sources"), as such Appendix existed on July 1, 1996.

3. Emissions Limitations

9.9 TPY for any single HAP and 24.9 TPY for any combination of HAPs

Compliance with the HAPs emissions limits outlined in T&C A.2.b. shall be demonstrated by the recordkeeping requirements in T&C C.2.

4. Compliance with the operational restrictions for the wet scrubber in T&Cs B.1. and B.2. shall be demonstrated by the recordkeeping requirements in T&C C.1.

F. Miscellaneous Requirements

1. The following terms and conditions of this permit are federally enforceable: A, B, C.1, C.2, D and E.

PART II - SPECIAL TERMS AND CONDITIONS FOR SPECIFIC EMISSIONS UNIT(S)

A. Applicable Emissions Limitations and/or Control Requirements

1. The specific operations(s), property, and/or equipment which constitute this emissions unit are listed in the following table along with the applicable rules and/or requirements and with the applicable emissions limitations and/or control measures. Emissions from this unit shall not exceed the listed limitations, and the listed control measures shall be specified in narrative form following the table.

Operations, Property, and/or Equipment	Applicable Rules/Requirements	Applicable Emissions Limitations/Control Measures
P071 - B25 - AMT Barrel Reactor; CS-2 - Plant-wide condenser, scrubber, and hydrogen recovery unit	OAC rule 3745-31-05(A)(3)	The hydrochloric acid (HCl) emissions shall not exceed 0.001 pound per hour (lb/hr). The hydrochloric acid (HCl) emissions shall not exceed 0.002 Tons per Year (TPY). See T&C A.2.c. The requirements of this rule also include compliance with the requirements of OAC rule 3745-31-05(C) and OAC rule 3745-17-07(A)(1).
	OAC rule 3745-31-05(C)	See T&C A.2.b.
	OAC rule 3745-17-07(A)(1)	Visible particulate emissions from any stack associated with emissions unit P071 shall not exceed 20 percent opacity, as a six-minute average, except as specified by rule.
	OAC rule 3745-17-11(B)	The emission limitation specified by this rule is less stringent than the

emission limitation established pursuant to OAC rule 3745-31-05(A)(3).

2. Additional Terms and Conditions

2.a The hourly emission limitations outlined in term A.1. are based upon the emissions unit's potential to emit. Therefore, no hourly records are required to demonstrate compliance with these limits.

2.b The actual emissions of Hazardous Air Pollutants (HAPs), as identified in Section 112(b) of Title III of the Clean Air Act, from this facility shall not exceed 9.9 TPY for any single HAP and 24.9 TPY for any combination of HAPs. Compliance with the above limitations shall be based on a rolling, 12-month summation. The permittee has existing records to demonstrate compliance with these limits upon issuance of this permit.

2.c Compliance with OAC rule 3745-31-05(A)(3) shall be demonstrated by the use of a wet scrubber, compliance with the HCl emissions limits and compliance with the facility-wide HAPs emissions limits.

B. Operational Restrictions

1. The scrubber water recirculation flow rate shall be continuously maintained at a value of not less than 60 gallons per minute at all times while the emissions unit is in operation.

2. The pH of the scrubbing liquor shall be maintained within the range of 8-13 at all times while the emissions unit is in operation.

C. Monitoring and/or Recordkeeping Requirements

1. The permittee shall properly install, operate and maintain equipment to continuously monitor the scrubber water recirculation flow rate into the scrubber and the pH of the scrubber liquor while the emissions unit is in operation. The monitoring devices and any recorders shall be installed, calibrated, operated and maintained in accordance with the manufacturer's recommendations, instructions and operating manuals.

   The permittee shall collect and record the following information each day:

   a. the scrubber water recirculation flow rate, in gallons per minute, on a once per day basis;

   b. the pH of the scrubber liquor, on a once per day basis; and

c. the operating times for the capture (collection) system, control device, monitoring equipment, and the associated emissions unit.

2. The permittee shall collect and record the following information each month for the entire facility:

a. for all epitaxial reactors, the amount of hydrogen chloride (HCl) used (input), in pounds;

b. for all epitaxial reactors, the amount of HCl released from the reaction of trichlorosilane, in pounds;

c. for all epitaxial reactors, the amount of controlled emissions of each HAP, in tons;

d. for all emissions units, the amount of any other material used which contains HAPs, in tons;

e. for all emissions units, the individual HAP content for each HAP of each material used, in percent by weight (ton HAP/ton material);

f. the total individual HAP emissions for each HAP from all materials employed, in tons per month [for each HAP the sum of c. plus (d. times e.)];

g. the total combined HAP emissions from all materials employed, in tons per month (the sum of all HAPs as calculated in f.);

h. the updated rolling, 12-month summation of each individual HAP emissions, in pounds or tons. This shall include the information for the current month and the preceding eleven calender months ; and

i. the updated rolling, 12-month summation of total combined HAP emissions, in pounds or tons. This shall include the information for the current month and the preceding eleven calender months.

* A listing of the HAPs can be found in Section 112(b) of the Clean Air Act or can be obtained by contacting your Hamilton County Department of Environmental Services contact. This information does not have to be kept on a individual emissions unit basis.

3. The permit to install for emissions units P024 - P035 and P051 - P074 was evaluated based on the actual materials (typically coatings and cleanup materials) and the design parameters of the emissions unit's exhaust systems, as specified by the permittee in the permit to install application. The Ohio EPA's "Review of New Sources of Air Toxic Emissions" policy ("Air Toxic Policy") was applied for each pollutant emitted by this emissions unit using data from the permit to install

application and the SCREEN 3.0 model (or other Ohio EPA approved model). The predicted 1-hour maximum ground-level concentration from the use of the SCREEN 3.0 model was compared to the Maximum Ground-Level Concentration (MAGLC).

The following summarizes the results of the modeling for the "worst case" pollutant(s):

Pollutant: HCl (CAS 7647-01-0)

TLV (ug/m^3): 2198

Maximum Hourly Emission Rate (lbs/hr): 0.132 lbs/hr HCl, P024 - P035 and P051 - P074, combined

Predicted 1-Hour Maximum Ground-Level Concentration (ug/m^3): 30.68 Ug/m^3, P024 - P035 and P051 - P074, combined

MAGLC (ug/m^3): 52.33

Physical changes to or in the method of operation of the emissions unit after it's installation or modification could affect the parameters used to determine whether or not the "Air Toxics Policy" is satisfied. Consequently, prior to making a change that could impact such parameters, the permittee shall conduct an evaluation to determine that the "Air Toxic Policy" will still be satisfied. If, upon evaluation, the permittee determines that the "Air Toxic Policy" will not be satisfied, the permittee will not make the change. Changes that can affect the parameters used in the "Air Toxic Policy" include the following:

a. changes in the composition of the materials used (typically for coatings or cleanup materials), or the use of new materials, that would result in the emission of a compound with a lower Threshold Limit Value (TLV), as indicated in the most recent version of the handbook entitled "American Conference of Governmental Industrial Hygienists (ACGIH)," than the lowest TLV value previously modeled;

b. changes in the composition of the materials, or use of new materials, that would result in an increase in emissions of any pollutant with a listed TLV that was proposed in the application and modeled; and

c. physical changes to the emissions unit or its exhaust parameters (e.g., increased/decreased exhaust flow, changes in stack height, changes in stack diameter, etc.).

If the permittee determines that the "Air Toxic Policy" will be satisfied for the above changes, the Ohio EPA will not consider the change(s) to be a "modification" under OAC rule 3745-31-01

solely due to the emissions of any type of toxic air contaminant not previously emitted, and a modification of the existing permit to install will not be required, even if the toxic air contaminant emissions are greater than the de minimis level in OAC rule 3745-15-05. If the change(s) is (are) defined as a modification under other provisions of the modification definition, then the permittee shall obtain a final permit to install prior to the change.

The permittee shall collect, record, and retain the following information when it conducts evaluations to determine that the changed emissions unit will satisfy the Air Toxic Policy:"

a. a description of the parameters changed(composition of materials, new pollutants emitted, change in stack/exhaust parameters, etc.);

b. documentation of it's evaluation and determination that the changed emissions unit still satisfies the "Air Toxic Policy"; and

c. when the computer modeling is performed, a copy of the resulting computer model runs that show the results of the application of the "Air Toxic Policy" for the change.

D. Reporting Requirements

1. The permittee shall submit quarterly deviation (excursion) reports to the Hamilton County Department of Environmental Services that identify all periods of time during which the following scrubber parameters were not maintained within the requirements of the Operational Restrictions:

   a. the scrubber water recirculation flow rate; and

   b. the scrubber solution pH.

   If no exceedances occurred during the reporting period then a report is required stating so. These reports shall be submitted by January 31, April 30, July 31, and October 31 of each year and shall cover the previous calendar quarters.

2. The permittee shall notify the Hamilton County Department of Environmental Services of any exceedance of the HAP emissions limitations set forth in term A.2.b. The reports shall be submitted to the Director (the Hamilton County Department of Environmental Services) by January 31, April 30, July 31 and October 31 of each year and shall cover the previous three calendar months (October through December, January through March, April through June and July through September, respectively.)

   If no exceedances occurred, the permittee shall state so in the report.

E. Testing Requirements

Emissions Unit ID: **P071**

1. Emissions Limitations

The hydrochloric acid (HCl) emissions shall not exceed 0.001 pound per hour (lb/hr)
The hydrochloric acid (HCl) emissions shall not exceed 0.002 Tons per Year (TPY)

Applicable Compliance Methods

Compliance with the hourly HCl emissions limitation shall be determined by the following calculations:

a. for the conversion of TCS to HCl in the scrubber:

actual trichlorosilane usage (lbs TCS/hr) x unit conversion trichlorosilane (1 mole TCS/135.4524 gMW TCS) x stoichiometric ratio (3 moles HCl/1 mole TCS) x unit conversion HCl (36.3609 gMW HCL/1 mole HCl) = lbs HCl/hr

b. for the addition of HCl in the hi-etch process:

actual cycle time (min/cycle) x actual production rate (cycles/hr) x actual flow rate (liters HCl/hr) x conversion factor (ft3/28.3168 liters) x conversion factor (1 lb HCl/9.7752 ft3 HCl) = lbs HCl/hr; and

c. (lbs HCl/hr from the conversion of TCS + lbs HCl/hr from the addition of HCl) x scrubber efficiency (1 - 99.5/100) = lbs HCl/hr from the scrubber stack

Compliance with the annual HCl emissions limitation shall be determined by the recordkeeping requirement in T&C C.2.h.

2. Emissions Limitation

Visible particulate emissions from any stack associated with emissions unit P071 shall not exceed 20 percent opacity, as a six-minute average, except as specified by rule

Applicable Compliance Method

Compliance shall be determined in accordance with Test Method 9 as set forth in "Appendix on Test Methods" in 40 CFR, Part 60 ("Standards of Performance for New Stationary Sources"), as such Appendix existed on July 1, 1996.

3. Emissions Limitations

9.9 TPY for any single HAP and 24.9 TPY for any combination of HAPs

Compliance with the HAPs emissions limits outlined in T&C A.2.b. shall be demonstrated by the recordkeeping requirements in T&C C.2.

4. Compliance with the operational restrictions for the wet scrubber in T&Cs B.1. and B.2. shall be demonstrated by the recordkeeping requirements in T&C C.1.

F. Miscellaneous Requirements

1. The following terms and conditions of this permit are federally enforceable: A, B, C.1, C.2, D and E.

PART II - SPECIAL TERMS AND CONDITIONS FOR SPECIFIC EMISSIONS UNIT(S)

A. Applicable Emissions Limitations and/or Control Requirements

1. The specific operations(s), property, and/or equipment which constitute this emissions unit are listed in the following table along with the applicable rules and/or requirements and with the applicable emissions limitations and/or control measures. Emissions from this unit shall not exceed the listed limitations, and the listed control measures shall be specified in narrative form following the table.

Operations, Property, and/or Equipment	Applicable Rules/Requirements	
P072 - B26 - AMT Barrel Reactor; CS-2 - Plant-wide condenser, scrubber, and hydrogen recovery unit	OAC rule 3745-31-05(A)(3)	OAC rule 3745-17-11(B)
	OAC rule 3745-31-05(C) (to avoid being subject to OAC rules 3745-31-28 and Title V permitting requirements)	
	OAC rule 3745-17-07(A)(1)	

Applicable Emissions Limitations/Control Measures
The hydrochloric acid (HCl) emissions shall not exceed 0.001 pound per hour (lb/hr).
The hydrochloric acid (HCl) emissions shall not exceed 0.002 Tons per Year (TPY). See T&C A.2.c.
The requirements of this rule also include compliance with the requirements of OAC rule 3745-31-05(C) and OAC rule 3745-17-07(A)(1). See T&C A.2.b.
Visible particulate emissions from any stack associated with emissions unit P072 shall not exceed 20 percent opacity, as a six-minute average, except as specified by rule.
The emission limitation specified by this rule is less stringent than the emission limitation established pursuant to OAC rule 3745-31-05(A)(3).

2. Additional Terms and Conditions

2.a The hourly emission limitations outlined in term A.1. are based upon the emissions unit's potential to emit. Therefore, no hourly records are required to demonstrate compliance

with these limits.

2.b The actual emissions of Hazardous Air Pollutants (HAPs), as identified in Section 112(b) of Title III of the Clean Air Act, from this facility shall not exceed 9.9 TPY for any single HAP and 24.9 TPY for any combination of HAPs. Compliance with the above limitations shall be based on a rolling, 12-month summation. The permittee has existing records to demonstrate compliance with these limits upon issuance of this permit.

2.c Compliance with OAC rule 3745-31-05(A)(3) shall be demonstrated by the use of a wet scrubber, compliance with the HCl emissions limits and compliance with the facility-wide HAPs emissions limits.

B. Operational Restrictions

1. The scrubber water recirculation flow rate shall be continuously maintained at a value of not less than 60 gallons per minute at all times while the emissions unit is in operation.

2. The pH of the scrubbing liquor shall be maintained within the range of 8-13 at all times while the emissions unit is in operation.

C. Monitoring and/or Recordkeeping Requirements

1. The permittee shall properly install, operate and maintain equipment to continuously monitor the scrubber water recirculation flow rate into the scrubber and the pH of the scrubber liquor while the emissions unit is in operation. The monitoring devices and any recorders shall be installed, calibrated, operated and maintained in accordance with the manufacturer's recommendations, instructions and operating manuals.

   The permittee shall collect and record the following information each day:

   a. the scrubber water recirculation flow rate, in gallons per minute, on a once per day basis;

   b. the pH of the scrubber liquor, on a once per day basis; and

   c. the operating times for the capture (collection) system, control device, monitoring equipment, and the associated emissions unit.

2. The permittee shall collect and record the following information each month for the entire facility:

   a. for all epitaxial reactors, the amount of hydrogen chloride (HCl) used (input), in pounds;

b. for all epitaxial reactors, the amount of HCl released from the reaction of trichlorosilane, in pounds;

c. for all epitaxial reactors, the amount of controlled emissions of each HAP, in tons;

d. for all emissions units, the amount of any other material used which contains HAPs, in tons;

e. for all emissions units, the individual HAP content for each HAP of each material used, in percent by weight (ton HAP/ton material);

f. the total individual HAP emissions for each HAP from all materials employed, in tons per month [for each HAP the sum of c. plus (d. times e.)];

g. the total combined HAP emissions from all materials employed, in tons per month (the sum of all HAPs as calculated in f.);

h. the updated rolling, 12-month summation of each individual HAP emissions, in pounds or tons. This shall include the information for the current month and the preceding eleven calender months ; and

i. the updated rolling, 12-month summation of total combined HAP emissions, in pounds or tons. This shall include the information for the current month and the preceding eleven calender months.

* A listing of the HAPs can be found in Section 112(b) of the Clean Air Act or can be obtained by contacting your Hamilton County Department of Environmental Services contact. This information does not have to be kept on a individual emissions unit basis.

3. The permit to install for emissions units P024 - P035 and P051 - P074 was evaluated based on the actual materials (typically coatings and cleanup materials) and the design parameters of the emissions unit's exhaust systems, as specified by the permittee in the permit to install application. The Ohio EPA's "Review of New Sources of Air Toxic Emissions" policy ("Air Toxic Policy") was applied for each pollutant emitted by this emissions unit using data from the permit to install application and the SCREEN 3.0 model (or other Ohio EPA approved model). The predicted 1-hour maximum ground-level concentration from the use of the SCREEN 3.0 model was compared to the Maximum Ground-Level Concentration (MAGLC).

The following summarizes the results of the modeling for the "worst case" pollutant(s):

Pollutant: HCl (CAS 7647-01-0)

TLV (ug/m^3): 2198

Maximum Hourly Emission Rate (lbs/hr): 0.132 lbs/hr HCl, P024 - P035 and P051 - P074, combined

Predicted 1-Hour Maximum Ground-Level Concentration (ug/m^3): 30.68 Ug/m^3, P024 - P035 and P051 - P074, combined

MAGLC (ug/m^3): 52.33

Physical changes to or in the method of operation of the emissions unit after it's installation or modification could affect the parameters used to determine whether or not the "Air Toxics Policy" is satisfied. Consequently, prior to making a change that could impact such parameters, the permittee shall conduct an evaluation to determine that the "Air Toxic Policy" will still be satisfied. If, upon evaluation, the permittee determines that the "Air Toxic Policy" will not be satisfied, the permittee will not make the change. Changes that can affect the parameters used in the "Air Toxic Policy" include the following:

a. changes in the composition of the materials used (typically for coatings or cleanup materials), or the use of new materials, that would result in the emission of a compound with a lower Threshold Limit Value (TLV), as indicated in the most recent version of the handbook entitled "American Conference of Governmental Industrial Hygienists (ACGIH)," than the lowest TLV value previously modeled;

b. changes in the composition of the materials, or use of new materials, that would result in an increase in emissions of any pollutant with a listed TLV that was proposed in the application and modeled; and

c. physical changes to the emissions unit or its exhaust parameters (e.g., increased/decreased exhaust flow, changes in stack height, changes in stack diameter, etc.).

If the permittee determines that the "Air Toxic Policy" will be satisfied for the above changes, the Ohio EPA will not consider the change(s) to be a "modification" under OAC rule 3745-31-01 solely due to the emissions of any type of toxic air contaminant not previously emitted, and a modification of the existing permit to install will not be required, even if the toxic air contaminant emissions are greater than the de minimis level in OAC rule 3745-15-05. If the change(s) is (are) defined as a modification under other provisions of the modification definition, then the permittee shall obtain a final permit to install prior to the change.

The permittee shall collect, record, and retain the following information when it conducts evaluations to determine that the changed emissions unit will satisfy the Air Toxic Policy:"

a. a description of the parameters changed(composition of materials, new pollutants emitted, change in stack/exhaust parameters, etc.);

b. documentation of it's evaluation and determination that the changed emissions unit still satisfies the "Air Toxic Policy"; and

c. when the computer modeling is performed, a copy of the resulting computer model runs that show the results of the application of the "Air Toxic Policy" for the change.

D. Reporting Requirements

1. The permittee shall submit quarterly deviation (excursion) reports to the Hamilton County Department of Environmental Services that identify all periods of time during which the following scrubber parameters were not maintained within the requirements of the Operational Restrictions:

   a. the scrubber water recirculation flow rate; and

   b. the scrubber solution pH.

   If no exceedances occurred during the reporting period then a report is required stating so. These reports shall be submitted by January 31, April 30, July 31, and October 31 of each year and shall cover the previous calendar quarters.

2. The permittee shall notify the Hamilton County Department of Environmental Services of any exceedance of the HAP emissions limitations set forth in term A.2.b. The reports shall be submitted to the Director (the Hamilton County Department of Environmental Services) by January 31, April 30, July 31 and October 31 of each year and shall cover the previous three calendar months (October through December, January through March, April through June and July through September, respectively.)

   If no exceedances occurred, the permittee shall state so in the report.

E. Testing Requirements

1. Emissions Limitations

   The hydrochloric acid (HCl) emissions shall not exceed 0.001 pound per hour (lb/hr)
   The hydrochloric acid (HCl) emissions shall not exceed 0.002 Tons per Year (TPY)

   Applicable Compliance Methods

Compliance with the hourly HCl emissions limitation shall be determined by the following calculations:

a. for the conversion of TCS to HCl in the scrubber:

actual trichlorosilane usage (lbs TCS/hr) x unit conversion trichlorosilane (1 mole TCS/135.4524 gMW TCS) x stoichiometric ratio (3 moles HCl/1 mole TCS) x unit conversion HCl (36.3609 gMW HCL/1 mole HCl) = lbs HCl/hr

b. for the addition of HCl in the hi-etch process:

actual cycle time (min/cycle) x actual production rate (cycles/hr) x actual flow rate (liters HCl/hr) x conversion factor (ft3/28.3168 liters) x conversion factor (1 lb HCl/9.7752 ft3 HCl) = lbs HCl/hr; and

c. (lbs HCl/hr from the conversion of TCS + lbs HCl/hr from the addition of HCl) x scrubber efficiency (1 - 99.5/100) = lbs HCl/hr from the scrubber stack

Compliance with the annual HCl emissions limitation shall be determined by the recordkeeping requirement in T&C C.2.h.

2. Emissions Limitation

Visible particulate emissions from any stack associated with emissions unit P072 shall not exceed 20 percent opacity, as a six-minute average, except as specified by rule

Applicable Compliance Method

Compliance shall be determined in accordance with Test Method 9 as set forth in "Appendix on Test Methods" in 40 CFR, Part 60 ("Standards of Performance for New Stationary Sources"), as such Appendix existed on July 1, 1996.

3. Emissions Limitations

9.9 TPY for any single HAP and 24.9 TPY for any combination of HAPs

Compliance with the HAPs emissions limits outlined in T&C A.2.b. shall be demonstrated by the recordkeeping requirements in T&C C.2.

4. Compliance with the operational restrictions for the wet scrubber in T&Cs B.1. and B.2. shall be demonstrated by the recordkeeping requirements in T&C C.1.

F. Miscellaneous Requirements

1. The following terms and conditions of this permit are federally enforceable: A, B, C.1, C.2, D and E.

PART II - SPECIAL TERMS AND CONDITIONS FOR SPECIFIC EMISSIONS UNIT(S)

A. Applicable Emissions Limitations and/or Control Requirements

1. The specific operations(s), property, and/or equipment which constitute this emissions unit are listed in the following table along with the applicable rules and/or requirements and with the applicable emissions limitations and/or control measures. Emissions from this unit shall not exceed the listed limitations, and the listed control measures shall be specified in narrative form following the table.

Operations, Property, and/or Equipment	Applicable Rules/Requirements	
P073 - B27 - AMT Barrel Reactor; CS-2 - Plant-wide condenser, scrubber, and hydrogen recovery unit	OAC rule 3745-31-05(A)(3)	OAC rule 3745-17-11(B)
	OAC rule 3745-31-05(C) (to avoid being subject to OAC rules 3745-31-28 and Title V permitting requirements)	
	OAC rule 3745-17-07(A)(1)	

Applicable Emissions Limitations/Control Measures
The hydrochloric acid (HCl) emissions shall not exceed 0.001 pound per hour (lb/hr).
The hydrochloric acid (HCl) emissions shall not exceed 0.002 Tons per Year (TPY). See T&C A.2.c.
The requirements of this rule also include compliance with the requirements of OAC rule 3745-31-05(C) and OAC rule 3745-17-07(A)(1). See T&C A.2.b.
Visible particulate emissions from any stack associated with emissions unit P073 shall not exceed 20 percent opacity, as a six-minute average, except as specified by rule.
The emission limitation specified by this rule is less stringent than the emission limitation established pursuant to OAC rule 3745-31-05(A)(3).

2. Additional Terms and Conditions

2.a The hourly emission limitations outlined in term A.1. are based upon the emissions unit's potential to emit. Therefore, no hourly records are required to demonstrate compliance

with these limits.

2.b The actual emissions of Hazardous Air Pollutants (HAPs), as identified in Section 112(b) of Title III of the Clean Air Act, from this facility shall not exceed 9.9 TPY for any single HAP and 24.9 TPY for any combination of HAPs. Compliance with the above limitations shall be based on a rolling, 12-month summation. The permittee has existing records to demonstrate compliance with these limits upon issuance of this permit.

2.c Compliance with OAC rule 3745-31-05(A)(3) shall be demonstrated by the use of a wet scrubber, compliance with the HCl emissions limits and compliance with the facility-wide HAPs emissions limits.

B. Operational Restrictions

1. The scrubber water recirculation flow rate shall be continuously maintained at a value of not less than 60 gallons per minute at all times while the emissions unit is in operation.

2. The pH of the scrubbing liquor shall be maintained within the range of 8-13 at all times while the emissions unit is in operation.

C. Monitoring and/or Recordkeeping Requirements

1. The permittee shall properly install, operate and maintain equipment to continuously monitor the scrubber water recirculation flow rate into the scrubber and the pH of the scrubber liquor while the emissions unit is in operation. The monitoring devices and any recorders shall be installed, calibrated, operated and maintained in accordance with the manufacturer's recommendations, instructions and operating manuals.

   The permittee shall collect and record the following information each day:

   a. the scrubber water recirculation flow rate, in gallons per minute, on a once per day basis;

   b. the pH of the scrubber liquor, on a once per day basis; and

   c. the operating times for the capture (collection) system, control device, monitoring equipment, and the associated emissions unit.

2. The permittee shall collect and record the following information each month for the entire facility:

   a. for all epitaxial reactors, the amount of hydrogen chloride (HCl) used (input), in pounds;

b. for all epitaxial reactors, the amount of HCl released from the reaction of trichlorosilane, in pounds;

c. for all epitaxial reactors, the amount of controlled emissions of each HAP, in tons;

d. for all emissions units, the amount of any other material used which contains HAPs, in tons;

e. for all emissions units, the individual HAP content for each HAP of each material used, in percent by weight (ton HAP/ton material);

f. the total individual HAP emissions for each HAP from all materials employed, in tons per month [for each HAP the sum of c. plus (d. times e.)];

g. the total combined HAP emissions from all materials employed, in tons per month (the sum of all HAPs as calculated in f.);

h. the updated rolling, 12-month summation of each individual HAP emissions, in pounds or tons. This shall include the information for the current month and the preceding eleven calender months ; and

i. the updated rolling, 12-month summation of total combined HAP emissions, in pounds or tons. This shall include the information for the current month and the preceding eleven calender months.

* A listing of the HAPs can be found in Section 112(b) of the Clean Air Act or can be obtained by contacting your Hamilton County Department of Environmental Services contact. This information does not have to be kept on a individual emissions unit basis.

3. The permit to install for emissions units P024 - P035 and P051 - P074 was evaluated based on the actual materials (typically coatings and cleanup materials) and the design parameters of the emissions unit's exhaust systems, as specified by the permittee in the permit to install application. The Ohio EPA's "Review of New Sources of Air Toxic Emissions" policy ("Air Toxic Policy") was applied for each pollutant emitted by this emissions unit using data from the permit to install application and the SCREEN 3.0 model (or other Ohio EPA approved model). The predicted 1-hour maximum ground-level concentration from the use of the SCREEN 3.0 model was compared to the Maximum Ground-Level Concentration (MAGLC).

The following summarizes the results of the modeling for the "worst case" pollutant(s):

Pollutant: HCl (CAS 7647-01-0)

TLV (ug/m^3): 2198

Maximum Hourly Emission Rate (lbs/hr): 0.132 lbs/hr HCl, P024 - P035 and P051 - P074, combined

Predicted 1-Hour Maximum Ground-Level Concentration (ug/m^3): 30.68 Ug/m^3, P024 - P035 and P051 - P074, combined

MAGLC (ug/m^3): 52.33

Physical changes to or in the method of operation of the emissions unit after it's installation or modification could affect the parameters used to determine whether or not the "Air Toxics Policy" is satisfied. Consequently, prior to making a change that could impact such parameters, the permittee shall conduct an evaluation to determine that the "Air Toxic Policy" will still be satisfied. If, upon evaluation, the permittee determines that the "Air Toxic Policy" will not be satisfied, the permittee will not make the change. Changes that can affect the parameters used in the "Air Toxic Policy" include the following:

a. changes in the composition of the materials used (typically for coatings or cleanup materials), or the use of new materials, that would result in the emission of a compound with a lower Threshold Limit Value (TLV), as indicated in the most recent version of the handbook entitled "American Conference of Governmental Industrial Hygienists (ACGIH)," than the lowest TLV value previously modeled;

b. changes in the composition of the materials, or use of new materials, that would result in an increase in emissions of any pollutant with a listed TLV that was proposed in the application and modeled; and

c. physical changes to the emissions unit or its exhaust parameters (e.g., increased/decreased exhaust flow, changes in stack height, changes in stack diameter, etc.).

If the permittee determines that the "Air Toxic Policy" will be satisfied for the above changes, the Ohio EPA will not consider the change(s) to be a "modification" under OAC rule 3745-31-01 solely due to the emissions of any type of toxic air contaminant not previously emitted, and a modification of the existing permit to install will not be required, even if the toxic air contaminant emissions are greater than the de minimis level in OAC rule 3745-15-05. If the change(s) is (are) defined as a modification under other provisions of the modification definition, then the permittee shall obtain a final permit to install prior to the change.

The permittee shall collect, record, and retain the following information when it conducts evaluations to determine that the changed emissions unit will satisfy the Air Toxic Policy:"

a. a description of the parameters changed(composition of materials, new pollutants emitted, change in stack/exhaust parameters, etc.);

b. documentation of it's evaluation and determination that the changed emissions unit still satisfies the "Air Toxic Policy"; and

c. when the computer modeling is performed, a copy of the resulting computer model runs that show the results of the application of the "Air Toxic Policy" for the change.

D. Reporting Requirements

1. The permittee shall submit quarterly deviation (excursion) reports to the Hamilton County Department of Environmental Services that identify all periods of time during which the following scrubber parameters were not maintained within the requirements of the Operational Restrictions:

   a. the scrubber water recirculation flow rate; and

   b. the scrubber solution pH.

   If no exceedances occurred during the reporting period then a report is required stating so. These reports shall be submitted by January 31, April 30, July 31, and October 31 of each year and shall cover the previous calendar quarters.

2. The permittee shall notify the Hamilton County Department of Environmental Services of any exceedance of the HAP emissions limitations set forth in term A.2.b. The reports shall be submitted to the Director (the Hamilton County Department of Environmental Services) by January 31, April 30, July 31 and October 31 of each year and shall cover the previous three calendar months (October through December, January through March, April through June and July through September, respectively.)

   If no exceedances occurred, the permittee shall state so in the report.

E. Testing Requirements

1. Emissions Limitations

   The hydrochloric acid (HCl) emissions shall not exceed 0.001 pound per hour (lb/hr)
   The hydrochloric acid (HCl) emissions shall not exceed 0.002 Tons per Year (TPY)

   Applicable Compliance Methods

Compliance with the hourly HCl emissions limitation shall be determined by the following calculations:

a. for the conversion of TCS to HCl in the scrubber:

actual trichlorosilane usage (lbs TCS/hr) x unit conversion trichlorosilane (1 mole TCS/135.4524 gMW TCS) x stoichiometric ratio (3 moles HCl/1 mole TCS) x unit conversion HCl (36.3609 gMW HCL/1 mole HCl) = lbs HCl/hr

b. for the addition of HCl in the hi-etch process:

actual cycle time (min/cycle) x actual production rate (cycles/hr) x actual flow rate (liters HCl/hr) x conversion factor (ft3/28.3168 liters) x conversion factor (1 lb HCl/9.7752 ft3 HCl) = lbs HCl/hr; and

c. (lbs HCl/hr from the conversion of TCS + lbs HCl/hr from the addition of HCl) x scrubber efficiency (1 - 99.5/100) = lbs HCl/hr from the scrubber stack

Compliance with the annual HCl emissions limitation shall be determined by the recordkeeping requirement in T&C C.2.h.

2. Emissions Limitation

Visible particulate emissions from any stack associated with emissions unit P073 shall not exceed 20 percent opacity, as a six-minute average, except as specified by rule

Applicable Compliance Method

Compliance shall be determined in accordance with Test Method 9 as set forth in "Appendix on Test Methods" in 40 CFR, Part 60 ("Standards of Performance for New Stationary Sources"), as such Appendix existed on July 1, 1996.

3. Emissions Limitations

9.9 TPY for any single HAP and 24.9 TPY for any combination of HAPs

Compliance with the HAPs emissions limits outlined in T&C A.2.b. shall be demonstrated by the recordkeeping requirements in T&C C.2.

4. Compliance with the operational restrictions for the wet scrubber in T&Cs B.1. and B.2. shall be demonstrated by the recordkeeping requirements in T&C C.1.

F. Miscellaneous Requirements

1. The following terms and conditions of this permit are federally enforceable: A, B, C.1, C.2, D and E.

PART II - SPECIAL TERMS AND CONDITIONS FOR SPECIFIC EMISSIONS UNIT(S)

A. Applicable Emissions Limitations and/or Control Requirements

1. The specific operations(s), property, and/or equipment which constitute this emissions unit are listed in the following table along with the applicable rules and/or requirements and with the applicable emissions limitations and/or control measures. Emissions from this unit shall not exceed the listed limitations, and the listed control measures shall be specified in narrative form following the table.

Operations, Property, and/or Equipment	Applicable Rules/Requirements	
P074 - B28 - AMT Barrel Reactor; CS-2 - Plant-wide condenser, scrubber, and hydrogen recovery unit	OAC rule 3745-31-05(A)(3)	OAC rule 3745-17-11(B)
	OAC rule 3745-31-05(C) (to avoid being subject to OAC rules 3745-31-28 and Title V permitting requirements)	
	OAC rule 3745-17-07(A)(1)	

Applicable Emissions Limitations/Control Measures	
The hydrochloric acid (HCl) emissions shall not exceed 0.001 pound per hour (lb/hr).	
The hydrochloric acid (HCl) emissions shall not exceed 0.002 Tons per Year (TPY).	See T&C A.2.c.
The requirements of this rule also include compliance with the requirements of OAC rule 3745-31-05(C) and OAC rule 3745-17-07(A)(1).	See T&C A.2.b.
Visible particulate emissions from any stack associated with emissions unit P074 shall not exceed 20 percent opacity, as a six-minute average, except as specified by rule.	
The emission limitation specified by this rule is less stringent than the emission limitation established pursuant to OAC rule 3745-31-05(A)(3).	

2. Additional Terms and Conditions

2.a The hourly emission limitations outlined in term A.1. are based upon the emissions unit's potential to emit. Therefore, no hourly records are required to demonstrate compliance

with these limits.

2.b The actual emissions of Hazardous Air Pollutants (HAPs), as identified in Section 112(b) of Title III of the Clean Air Act, from this facility shall not exceed 9.9 TPY for any single HAP and 24.9 TPY for any combination of HAPs. Compliance with the above limitations shall be based on a rolling, 12-month summation. The permittee has existing records to demonstrate compliance with these limits upon issuance of this permit.

2.c Compliance with OAC rule 3745-31-05(A)(3) shall be demonstrated by the use of a wet scrubber, compliance with the HCl emissions limits and compliance with the facility-wide HAPs emissions limits.

B. Operational Restrictions

1. The scrubber water recirculation flow rate shall be continuously maintained at a value of not less than 60 gallons per minute at all times while the emissions unit is in operation.

2. The pH of the scrubbing liquor shall be maintained within the range of 8-13 at all times while the emissions unit is in operation.

C. Monitoring and/or Recordkeeping Requirements

1. The permittee shall properly install, operate and maintain equipment to continuously monitor the scrubber water recirculation flow rate into the scrubber and the pH of the scrubber liquor while the emissions unit is in operation. The monitoring devices and any recorders shall be installed, calibrated, operated and maintained in accordance with the manufacturer's recommendations, instructions and operating manuals.

   The permittee shall collect and record the following information each day:

   a. the scrubber water recirculation flow rate, in gallons per minute, on a once per day basis;

   b. the pH of the scrubber liquor, on a once per day basis; and

   c. the operating times for the capture (collection) system, control device, monitoring equipment, and the associated emissions unit.

2. The permittee shall collect and record the following information each month for the entire facility:

   a. for all epitaxial reactors, the amount of hydrogen chloride (HCl) used (input), in pounds;

b. for all epitaxial reactors, the amount of HCl released from the reaction of trichlorosilane, in pounds;

c. for all epitaxial reactors, the amount of controlled emissions of each HAP, in tons;

d. for all emissions units, the amount of any other material used which contains HAPs, in tons;

e. for all emissions units, the individual HAP content for each HAP of each material used, in percent by weight (ton HAP/ton material);

f. the total individual HAP emissions for each HAP from all materials employed, in tons per month [for each HAP the sum of c. plus (d. times e.)];

g. the total combined HAP emissions from all materials employed, in tons per month (the sum of all HAPs as calculated in f.);

h. the updated rolling, 12-month summation of each individual HAP emissions, in pounds or tons. This shall include the information for the current month and the preceding eleven calender months ; and

i. the updated rolling, 12-month summation of total combined HAP emissions, in pounds or tons. This shall include the information for the current month and the preceding eleven calender months.

* A listing of the HAPs can be found in Section 112(b) of the Clean Air Act or can be obtained by contacting your Hamilton County Department of Environmental Services contact. This information does not have to be kept on a individual emissions unit basis.

3. The permit to install for emissions units P024 - P035 and P051 - P074 was evaluated based on the actual materials (typically coatings and cleanup materials) and the design parameters of the emissions unit's exhaust systems, as specified by the permittee in the permit to install application. The Ohio EPA's "Review of New Sources of Air Toxic Emissions" policy ("Air Toxic Policy") was applied for each pollutant emitted by this emissions unit using data from the permit to install application and the SCREEN 3.0 model (or other Ohio EPA approved model). The predicted 1-hour maximum ground-level concentration from the use of the SCREEN 3.0 model was compared to the Maximum Ground-Level Concentration (MAGLC).

The following summarizes the results of the modeling for the "worst case" pollutant(s):

Pollutant: HCl (CAS 7647-01-0)

TLV (ug/m^3): 2198

Maximum Hourly Emission Rate (lbs/hr): 0.132 lbs/hr HCl, P024 - P035 and P051 - P074, combined

Predicted 1-Hour Maximum Ground-Level Concentration (ug/m^3): 30.68 Ug/m^3, P024 - P035 and P051 - P074, combined

MAGLC (ug/m^3): 52.33

Physical changes to or in the method of operation of the emissions unit after it's installation or modification could affect the parameters used to determine whether or not the "Air Toxics Policy" is satisfied. Consequently, prior to making a change that could impact such parameters, the permittee shall conduct an evaluation to determine that the "Air Toxic Policy" will still be satisfied. If, upon evaluation, the permittee determines that the "Air Toxic Policy" will not be satisfied, the permittee will not make the change. Changes that can affect the parameters used in the "Air Toxic Policy" include the following:

a. changes in the composition of the materials used (typically for coatings or cleanup materials), or the use of new materials, that would result in the emission of a compound with a lower Threshold Limit Value (TLV), as indicated in the most recent version of the handbook entitled "American Conference of Governmental Industrial Hygienists (ACGIH)," than the lowest TLV value previously modeled;

b. changes in the composition of the materials, or use of new materials, that would result in an increase in emissions of any pollutant with a listed TLV that was proposed in the application and modeled; and

c. physical changes to the emissions unit or its exhaust parameters (e.g., increased/decreased exhaust flow, changes in stack height, changes in stack diameter, etc.).

If the permittee determines that the "Air Toxic Policy" will be satisfied for the above changes, the Ohio EPA will not consider the change(s) to be a "modification" under OAC rule 3745-31-01 solely due to the emissions of any type of toxic air contaminant not previously emitted, and a modification of the existing permit to install will not be required, even if the toxic air contaminant emissions are greater than the de minimis level in OAC rule 3745-15-05. If the change(s) is (are) defined as a modification under other provisions of the modification definition, then the permittee shall obtain a final permit to install prior to the change.

The permittee shall collect, record, and retain the following information when it conducts evaluations to determine that the changed emissions unit will satisfy the Air Toxic Policy:"

a. a description of the parameters changed(composition of materials, new pollutants emitted, change in stack/exhaust parameters, etc.);

b. documentation of it's evaluation and determination that the changed emissions unit still satisfies the "Air Toxic Policy"; and

c. when the computer modeling is performed, a copy of the resulting computer model runs that show the results of the application of the "Air Toxic Policy" for the change.

D. Reporting Requirements

1. The permittee shall submit quarterly deviation (excursion) reports to the Hamilton County Department of Environmental Services that identify all periods of time during which the following scrubber parameters were not maintained within the requirements of the Operational Restrictions:

   a. the scrubber water recirculation flow rate; and

   b. the scrubber solution pH.

   If no exceedances occurred during the reporting period then a report is required stating so. These reports shall be submitted by January 31, April 30, July 31, and October 31 of each year and shall cover the previous calendar quarters.

2. The permittee shall notify the Hamilton County Department of Environmental Services of any exceedance of the HAP emissions limitations set forth in term A.2.b. The reports shall be submitted to the Director (the Hamilton County Department of Environmental Services) by January 31, April 30, July 31 and October 31 of each year and shall cover the previous three calendar months (October through December, January through March, April through June and July through September, respectively.)

   If no exceedances occurred, the permittee shall state so in the report.

E. Testing Requirements

1. Emissions Limitations

   The hydrochloric acid (HCl) emissions shall not exceed 0.001 pound per hour (lb/hr)
   The hydrochloric acid (HCl) emissions shall not exceed 0.002 Tons per Year (TPY)

   Applicable Compliance Methods

Compliance with the hourly HCl emissions limitation shall be determined by the following calculations:

a. for the conversion of TCS to HCl in the scrubber:

actual trichlorosilane usage (lbs TCS/hr) x unit conversion trichlorosilane (1 mole TCS/135.4524 gMW TCS) x stoichiometric ratio (3 moles HCl/1 mole TCS) x unit conversion HCl (36.3609 gMW HCL/1 mole HCl) = lbs HCl/hr

b. for the addition of HCl in the hi-etch process:

actual cycle time (min/cycle) x actual production rate (cycles/hr) x actual flow rate (liters HCl/hr) x conversion factor (ft3/28.3168 liters) x conversion factor (1 lb HCl/9.7752 ft3 HCl) = lbs HCl/hr; and

c. (lbs HCl/hr from the conversion of TCS + lbs HCl/hr from the addition of HCl) x scrubber efficiency (1 - 99.5/100) = lbs HCl/hr from the scrubber stack

Compliance with the annual HCl emissions limitation shall be determined by the recordkeeping requirement in T&C C.2.h.

2. Emissions Limitation

Visible particulate emissions from any stack associated with emissions unit P074 shall not exceed 20 percent opacity, as a six-minute average, except as specified by rule

Applicable Compliance Method

Compliance shall be determined in accordance with Test Method 9 as set forth in "Appendix on Test Methods" in 40 CFR, Part 60 ("Standards of Performance for New Stationary Sources"), as such Appendix existed on July 1, 1996.

3. Emissions Limitations

9.9 TPY for any single HAP and 24.9 TPY for any combination of HAPs

Compliance with the HAPs emissions limits outlined in T&C A.2.b. shall be demonstrated by the recordkeeping requirements in T&C C.2.

4. Compliance with the operational restrictions for the wet scrubber in T&Cs B.1. and B.2. shall be demonstrated by the recordkeeping requirements in T&C C.1.

F. Miscellaneous Requirements

1. The following terms and conditions of this permit are federally enforceable: A, B, C.1, C.2, D and E.