



**TECHNICAL REVIEW AND EVALUATION
OF APPLICATION FOR
AIR QUALITY PERMIT No. 94799**

I. INTRODUCTION

This Class II synthetic minor Renewal permit is for the continued operation of Pure Wafer Inc.'s silicon wafer reclamation facility. Permit No. 94799 renews and supersedes Permit No. 66477. A Class II synthetic minor permit is required because the facility's potential to emit, without controls or emission limitations, hydrogen fluoride (HF) exceeds the major source threshold for Hazardous Air Pollutants (HAPs). The Permittee voluntarily accepted emission limitations and controls to reduce emissions below the Class I permit major source threshold, therefore a Class II synthetic minor permit is required.

A. Company Information

Facility Name: Pure Wafer, Inc.
Mailing Address: 2575 Melville Road, Prescott, AZ 86301
Facility Location: 2575 Melville Road, Prescott, AZ 86301

B. Attainment Classification

The Pure Wafer facility is located in Yavapai County, which is classified attainment/unclassified for all criteria pollutants.

II. PROCESS DESCRIPTION

A. Process Equipment

The facility provides wafer reclamation services for the semiconductor industry by stripping, etching, cleaning, and polishing test wafers back to specifications for reuse in the semiconductor production process. The facility's silicon wafer reclamation equipment includes strip and etch benches and various wafer cleaning and processing benches. Auxiliary equipment on-site includes a 1.919 MMBtu/hour natural gas-fired boiler and a 250-HP diesel-fired emergency generator engine.

B. Control Devices

The facility operates 3 wet fume scrubbers to control emissions from the silicon wafer reclamation process.

III. COMPLIANCE HISTORY

The Pure Wafer facility was received four (4) full inspections and three (3) partial inspections during the permit term. The facility also submitted an Operations and Maintenance Plan revision for the fume scrubbers for review in November 2017. Ten (10) semiannual compliance

certifications were submitted by the facility and reviewed for compliance by the Department. Pure Wafer was not subject to any enforcement actions during this compliance period.

The Permittee was required to submit a permit deviation report after it was noted that the renewal permit application had not been submitted by the May 2, 2022 deadline to be considered a timely application submitted within 6 months of permit expiration, as required by Condition I.B of Attachment “A” of Permit No.66477. The permit application was submitted on June 7, 2022.

The Permittee conducted two performance tests during the permit term. The results are detailed in Table 1 below:

Table 1: Performance Test Results

Emission Unit	Pollutant	Date of Test	Emission Rate	Emission Limitation	Results
Fume Scrubber SC-1	HF	6/11/2019	.00013 lb/hr	.62 lb/hr	Pass
Fume Scrubber SC-3	HF	6/11/2019	.0069 lb/hr	.54 lb/hr	Pass
Fume Scrubber SC-1	HF	6/15/2021	.012 lb/hr	.62 lb/hr	Pass
Fume Scrubber SC-3	HF	6/15/2021	.15 lb/hr	.54 lb/hr	Pass

IV. EMISSIONS

The facility’s uncontrolled emissions from silicon wafer reclamation operations were evaluated using the engineering calculations methodology based on mass transfer kinetics currently found in Volume 2, Chapter 6 of the Air Emissions Inventory Improvement Project for Preferred and Alternative Methods for Estimating Air Emissions for Semiconductor Manufacturing. Controlled potential to emit was evaluated using a control efficiency of 70% for the wet fume scrubbers. Emissions from the boiler were evaluated using AP-42 Chapter 1.4 for Natural Gas Combustion, and emissions from the emergency generator were evaluated using AP-42 Chapter 3.3 for Gasoline and Diesel Industrial Engines.

The facility’s uncontrolled potential-to-emit (PTE) hazardous air pollutants in the form of HF exceeds the 10 tons per year (tpy) major source threshold for single HAPs. The facility voluntarily accepted emission limitations and controls to reduce the facility’s evaluated potential-to-emit below the major source threshold for a single HAP. The facility’s PTE is provided in Table 2 below:

Table 2: Potential to Emit (tpy)

Pollutant	PTE
NO _x	2.8
PM ₁₀	0.2
PM _{2.5}	0.2
CO	1.1
SO ₂	0.1
VOC	0.2
Pb	0

Single HAP (HF)	4.9
Total HAPs (HF & HCL)	6.3

V. VOLUNTARILY ACCEPTED EMISSION LIMITATIONS AND STANDARDS

The permit contains the following voluntary emission limitations and standards:

A. Fume Scrubber SC-1

The Permittee accepted a voluntary emission limit of .49 pounds of HF in any one-hour period, and voluntarily installed, operates, and maintains Fume Scrubber 1 to capture and control emissions released from process equipment in order to avoid exceeding the single HAP major source threshold and consequently require a Class I air permit.

B. Fume Scrubber SC-3

The facility accepted a voluntary emission limit of .64 pounds of HF in any one-hour period, and voluntarily installed, operates, and maintains Fume Scrubber 3 to capture and control emissions released from process equipment in order to avoid exceeding the single HAP major source threshold and consequently require a Class I air permit.

VI. APPLICABLE REGULATIONS

Table 3 identifies applicable regulations and verification as to why that standard applies. The table also contains a discussion of any regulations the emission unit is exempt from.

Table 3: Applicable Regulations

Unit	Control Device	Rule	Discussion
Silicon Wafer Reclamation	Fume Scrubbers 1, 2, and 3	A.A.C. R18-2-730	The silicon wafer reclamation operations are applicable to Standards of Performance for Unclassified Sources.
Boiler	N/A	A.A.C. R18-2-724	These standards are applicable to all boiler operations at the facility.

Unit	Control Device	Rule	Discussion
Emergency Generator Engine	N/A	A.A.C. R18-2-719 40 CFR 63 Subpart ZZZZ	These standards are applicable to all existing internal combustion engines 40 CFR 63 Subpart ZZZZ is applicable to existing stationary reciprocating internal combustion engines that commenced construction prior to June 12, 2006 and are located at area sources of HAP emissions.
Fugitive dust sources	Water Trucks, Dust Suppressants	A.A.C. R18-2 Article 6 A.A.C. R18-2-702	These standards are applicable to all fugitive dust sources at the facility.
Abrasive Blasting	Wet blasting; Dust collecting equipment; Other approved methods	A.A.C. R-18-2-702 A.A.C. R-18-2-726	These standards are applicable to any abrasive blasting operation.
Spray Painting	Enclosures	A.A.C. R18-2-702 A.A.C. R-18-2-727	These standards are applicable to any spray painting operation.
Demolition/renovation Operations	N/A	A.A.C. R18-2-1101.A.8	This standard is applicable to any asbestos related demolition or renovation operations.

VII. PREVIOUS PERMIT REVISIONS AND CONDITIONS

A. Previous Permit Revisions

Table 4 provides a description of the permit revisions made to Permit No. 66477 during the previous permit term.

Table 4: Permit Revisions to Permit No. 66477

Permit Revision No.	Permit Revision Type	Brief Description
78548	Minor Permit Revision	Installation and operation of Strip and Etch Bench #4.

B. Changes to Current Renewal

Table 5 addresses the changes made to the sections and conditions from Permit No. 66477.

Table 5: Previous Permit Conditions

Section No.	Determination			Comments
	Added	Revised	Deleted	
Att. "A"		X		General Provisions: Revised to represent the most recent template language
Att. "B" Section I		X		Facility Wide Requirements: Revised to represent the most recent template language
Att. "B" Section II		X		Silicon Wafer Reclamation: Revised to update emission limitations and streamline requirements.
Att. "B" Section III		X		Boiler Operations: Revised to streamline boiler emission limitations.
Att. "B" Section IV		X		Internal Combustion Engine: Revised to represent most recent language in 40 CFR 63 Subpart ZZZZ and streamline requirements.
Att. "B" Section VI			X	Mobile Source Requirements: Removed to represent the most recent template language.
Att. "C"		X		Equipment List: Revised to reflect the most recent equipment operating at the facility and to include equipment information provided.

VIII. MONITORING, RECORDKEEPING, AND REPORTING REQUIREMENTS

Table 6 contains an inclusive but not an exhaustive list of the monitoring, recordkeeping and reporting requirements prescribed by the air quality permit. The table below is intended to provide insight to the public for how the Permittee is required to demonstrate compliance with the emission limits in the permit.

Table 6: Permit No. 94799

Emission Unit	Pollutant	Emission Limit	Monitoring Requirements	Recordkeeping Requirements	Reporting Requirements
Silicon Wafer Reclamation	HF, HCL	Fume Scrubber SC-1: .49 pounds per any 1-hour period Fume Scrubber SC-3: .64 pounds per any 1-hour period 20% Opacity	Monitor and keep record of operating parameters as specified in the Operation and Maintenance Plan. Conduct monthly opacity monitoring from the fume scrubbers. Conduct performance test for HF emissions from Fume Scrubbers SC-1 and SC-3 during the second and fourth years of the permit term.	Keep record of operating parameters as specified in the Operation and Maintenance Plan. Keep records of the maintenance conducted on Fume Scrubbers SC-1, SC-2, and SC-3.	
Boiler	PM	15% Opacity	Conduct monthly opacity monitoring of the stacks of all boilers.	Records of the fuel used in all the boilers.	Report all 6-minute-periods which the opacity exceeded 15%.
Emergency Generator Engine	PM	40% Opacity – for any period greater than 10 seconds	Conduct quarterly opacity monitoring of the engine stack.	Maintain records of the lower heating value of the fuel.	

Emission Unit	Pollutant	Emission Limit	Monitoring Requirements	Recordkeeping Requirements	Reporting Requirements
	SO ₂	1.0 lb/MMBtu		Record the daily sulfur content of the fuel used in the engines.	Report to the Director any daily period which the sulfur content exceeds 0.8%.
	HAPs		<p>Change oil and filter every 500 hours of operation or annually, whichever comes first, or utilize the oil analysis program described in 40 CFR 63.6625(i).</p> <p>Inspect air cleaner every 1,000 hours of operation or annually, whichever comes, first, and replace as necessary.</p> <p>Inspect all hoses and belts every 500 hours of operation or annually, whichever comes first, and replace as necessary.</p> <p>Install a non-resettable hour meter.</p>	<p>If using the oil analysis program, keep records of parameters analyzed and results of the oil analysis, if any, and oil changes for the engine.</p> <p>Keep records of maintenance conducted on the emergency generator engine.</p> <p>Document how many hours are spent on emergency operation, including what classified the operation as emergency, and how many hours are spent for non-emergency operations.</p>	
Fugitive Dust	PM	40% Opacity	A Method 9 observer is required to conduct a	Record of the dates and types of dust control measures employed, and if applicable, the results of	

Emission Unit	Pollutant	Emission Limit	Monitoring Requirements	Recordkeeping Requirements	Reporting Requirements
			monthly survey of visible emissions.	any Method 9 observations, and any corrective action taken to lower the opacity of any excess emissions.	
Abrasive Blasting	PM	20% Opacity		Record the date, duration and pollution control measures of any abrasive blasting project.	
Spray Painting	VOC	20% Opacity Control 96% of the overspray		Maintain records of the date, duration, quantity of paint used, any applicable SDS, and pollution control measures of any spray painting project.	
Demolition/ Renovation	Asbestos			Maintain records of all asbestos related demolition or renovation projects including the “NESHAP Notification for Renovation and Demolition Activities” form and all supporting documents.	

IX. ENVIRONMENTAL JUSTICE ANALYSIS

The EPA (Environmental Protection Agency) defines Environmental Justice (EJ) to include the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. The goal of completing an EJ assessment in permitting is to provide an opportunity for overburdened populations or communities to allow for meaningful participation in the permitting process. Overburdened is used to describe the minority, low-income, tribal and indigenous populations or communities that potentially experience disproportionate environmental harms and risks due to exposures or cumulative impacts or greater vulnerability to environmental hazards. The renewal permit does not allow or permit any increases in emissions and will not result in any additional impacts.

X. LEARNING SITE EVALUATION

In accordance with Arizona Department of Environmental Quality’s (ADEQ) Environmental Permits and Approvals near Learning Sites Policy, the Department is required to conduct an evaluation to determine if any nearby learning sites would be adversely impacted by the facility. Learning sites consist of all existing public schools, charter schools and private schools the K-12 level, and all planned sites for schools approved by the Arizona School Facilities Board. The learning sites policy was established to ensure that the protection of children at learning sites is considered before a permit approval is issued by ADEQ.

This renewal will not result in any increase in emissions as there are no changes to any equipment. Therefore, the facility is exempt from the learning sites evaluations.

XI. LIST OF ABBREVIATIONS

A.A.C.	Arizona Administrative Code
ADEQ	Arizona Department of Environmental Quality
A.R.S.	Arizona Revised Statutes
BACT	Best Available Control Technology
Btu/hour	British Thermal Units per Hour
CFR	Code of Federal Regulations
CO	Carbon Monoxide
EJ	Environmental Justice
EPA	Environmental Protection Agency
HAP	Hazardous Air Pollutant
HCL	Hydrogen Chloride
HF	Hydrogen Fluoride
HP	Horsepower
NESHAP	National Emission Standards for Hazardous Air Pollutants
NO _x	Nitrogen Oxides
Pb	Lead
PM	Particulate Matter
PM10	Particulate Matter less than 10 µm nominal aerodynamic diameter
PM2.5	Particulate Matter less than 2.5 µm nominal aerodynamic diameter
PTE	Potential to Emit
SDS	Safety Data Sheet
SO _x	Sulfur Oxides

TPY..... Tons per Year

VOC..... Volatile Organic Compound