APPENDIX G

Compliance Assurance Monitoring Plan

Compliance Assurance Monitoring Plan

Control by Adosrber/Desorber and Thermal Oxidizer for VOC Emissions from 24 CMAP Machines

AVX Corporation
Myrtle Beach, South Carolina

September 2010

RESOLUTE ENVIRONMENTAL LLC

Compliance Assurance Monitoring Plan

VOC Control by Adsorber/Desorber and Thermal Oxidizer for 24 CMAP Build Up Machines

AVX Corporation
Myrtle Beach, South Carolina

Air Permit No. TV-1340-0002

Prepared For:

AVX Corporation

801 17th Avenue South

Myrtle Beach, South Carolina 29578

Prepared By:

Resolute Environmental, LLC

114 Oak Fern Lane

Willow Spring, North Carolina 27592

September 2010

Table of Contents

1. INTRODUCTION

The AVX Corporation (AVX) owns and operates an electronic capacitor manufacturing facility in Myrtle Beach, South Carolina. Operations at AVX include Raw Materials Manufacturing (RMM), Slip Manufacturing, Metals Department, CMAP Buildup, CMAP Support, Kiln Room, Metallization Department and other supporting processes.

AVX currently operates all emission sources under Title V Permit No. TV-1340-0002 issued by the South Carolina Department of Health and Environmental Control (DHEC) and is in the process of renewing this operating permit. Under USEPA regulations promulgated at 40 CFR 64, a facility must submit a Compliance Assurance Monitoring Plan (CAM Plan) for all affected sources at the time of renewal of its initial Title V permit. The regulations under 40 CFR 64 are commonly referred to as the CAM Rule. This CAM Plan is being submitted in compliance with the requirements specified in 40 CFR 64.

II. CAM Rule

The CAM rule applies to pollutant specific emission units (PSEU) located at a major source that meet all of the following criteria:

a. The PSEU is subject to an emission limit or standard, and
b. The PSEU uses a control device to achieve compliance, and
c. Potential pre-control emissions from the PSEU are equal to or exceed 100% of the major source threshold.

The major source thresholds are 100 tons/yr of criteria pollutants (including PM and SO_2), 25 tons/yr of total hazardous air pollutants (HAPs), and 10 tons/yr of a single HAP.

The CAM rule requires facilities to design and implement CAM Plans for affected PSEU to assure that control devises are maintained and operated at levels that will result in compliance with the emission limits. Owners are required to:

- select representative parameters upon which compliance can be assured,
- establish indicator ranges (or procedures for setting indicator ranges) for the parameters,
- use performance testing or other information to verify the parameters and ranges, and
- correct control device performance problems as expeditiously as practicable.

The CAM Plan must:

a. Describe the indicators to be monitored and how they are to be measured;
b. Describe the indicator ranges or the process by which the indicators are to be established;
c. Describe the performance criteria for the monitoring approach, including
    - specifications for obtaining representative data
    - quality assurance and control procedures
    - monitoring frequency
    - data collection procedures
    - data averaging period;
d. Provide a justification for the proposed elements of the monitoring;
e. Provide historical monitoring data, emissions test data and control device operating data recorded during performance tests, if necessary;

Provide an implementation plan, if monitoring requires installation, testing, or other activities prior to installation.

III. Affected Units

The CMAP build up process is the only source at AVX with potential CAM Rule applicability. It has an uncontrolled, potential volatile organic compound (VOC) emission rate of 116 ton/yr, which is greater than the major source threshold and uses three adsorber/desorbers and thermal oxidizer abatement system to control VOC emissions. The current Title V permit limits VOC emissions from the building that includes CMAP build up to 39.5 ton/yr to avoid Prevention of Significant Deterioration applicability (S.C. Regulation 61-62.5, Section H – Synthetic Minor Plant

Permits). With significant operational and emission reduction changes at AVX, removal of this emission limitation has been requested in the Title V renewal application. The only other emission limitation applicable to CMAP build up equipment is S.C. Regulation 61-62.5, Standard 4, Section IX requiring 20% or less opacity. S.C. 61-62.5, Standard 3, Section III (Waste Combustion and Reduction) limits the thermal oxidizer particulate matter emissions to 0.5 lb/MMBtu and opacity to 20%, except during periods of startup and shut down (Item I, Industrial Incinerators). Operating the source and control equipment consistent with good air pollution control practices will result in meeting the requirements of Standard 3. To summarize, with removal of 39.5 ton/yr VOC emission limit, CAM Rule applicability items a. and b. above do not apply to CMAP build up, and therefore a CAM Plan is not required. However, with AVX's continued commitment to reducing environmental impacts, the VOC abatement system will continue to be operated by AVX. This Plan is submitted as part of that commitment to demonstrate that the adsorber/desorbers and thermal oxidizer will be operated in accordance with the parametric monitoring requirements of the operating permit.

IV. COMPLIANCE ASSURANCE MONITORING PLAN CMAP BUILD UP VOC EMISISONS CONTROLLED BY AN ADORBER/DESORBER AND THERMAL OXIDIZER

1. Background

CMAP machines are tools used by AVX to manufacture capacitor chips of varying sizes using ceramic and electrode ink raw materials. The raw materials emit VOCs which are captured by 24 CMAP machines that deliver the compounds to the emission abatement system. The control system includes three adsorber/desorbers that are connected in parallel to concentrate the organics in the air stream, which is delivered to a 1 MMBtu/hr thermal oxidizer (TO-1) for destruction. A set of eight (8) CMAP machines are connected to one 5,000 cfm adsorber/desorber (AD-1). Another set of 4 CMAP machines are connected to a separate 5,000 cfm adsorber/desorber (AD-2) and 12 machines are connected to a 14,000 cfm adsorber/desorber (AD-3).

2. Process Design

Process air from the CMAP machines enters the bottom of the adsorber and is directed upward through a series of sieve trays fluidizing beaded activated carbon (BAC) on the trays. The counter-current contact of process gas and carbon removes solvent vapors from the air stream. Spent carbon from the last tray collects in the adsorption bottom before it is pneumatically transported to the top of the desorber. The BAC flows down through the desorber as a moving bed. It passes through a ceramic heated zone in which the concentrated solvent is desorbed from the BAC. The highly concentrated VOC stream is then delivered to the thermal oxidizer to be burned.

3. Applicable Emission Limits and Standards

The CMAP build up process is the only source at AVX with potential CAM Rule applicability. It has an uncontrolled, potential volatile organic compound (VOC) emission rate of 116 ton/yr, which is greater than the major source threshold and uses three adsorber/desorbers and thermal oxidizer abatement system to control VOC emissions. The current Title V permit limits VOC emissions from the building that includes CMAP build up to 39.5 ton/yr to avoid Prevention of Significant Deterioration applicability (S.C. Regulation 61-62.5, Section H – Synthetic Minor Plant Permits). With significant operational and emission reduction changes at AVX, removal of this

emission limitation has been requested in the Title V renewal application. With removal of 39.5 ton/yr VOC emission limit, the CAM Rule does not apply because the air pollution control system will not be used to meet an applicable standard. However, with AVX's continued commitment to reducing environmental impacts, the VOC abatement system will continue to be operated by AVX. This Plan is submitted as part of that commitment to demonstrate that the adsorber/desorbers and thermal oxidizer will be operated in accordance with the parametric monitoring requirements of the operating permit.

4. Rationale for Selection of Performance Indicator

S.C. Regulation 61-62.5, Standard 3, Section III, Item I is applicable to the thermal oxidizer and limits emissions from the unit to 20% opacity (except during periods of start up and shutdown) and particulate matter emissions to 0.5 lb/MMBtu. Similarly, S.C. Regulation 61-62.5, Standard 4, Section IX limits the CMAP build up equipment to 20% opacity. Each of these limitations are based on the control of particulate matter emissions. Since CMAP build up emits little to no particulate matter, and the thermal oxidizer burns concentrated VOCs or natural gas, it is highly improbable that any violation of the applicable Rules limiting particulate matter and opacity would occur. Further, the uncontrolled particulate matter emission rate associated with firing natural gas would be well below the 100 ton/yr major source CAM Rule applicability threshold.

As indicated previously, the removal of the 39.5 ton/yr VOC limit from the CMAP production building eliminates the requirement of a CAM Plan for the CMAP build up air pollution abatement system building because the system will no longer be used to meet an emission limit. However, AVX will continue to operate the unit as required by the operating permit and use the CAM Rule as guidance for operation. In 40 CFR 64.4, the CAM Rule establishes the concept of presumptively acceptable monitoring approaches. This concept presumes that existing monitoring requirements specified by USEPA or permitting authorities for specific emission sources establishes acceptable monitoring approaches for other similar sources. Based on the system design, the AVX operating permit requires monitoring pressure drop across the adsorbers, temperature in the desorbers, and temperature in the thermal oxidizer to demonstrate effective VOC destruction.

5. Rationale for Selection of Indicator Ranges

On February 26, 2009, AVX conducted a performance test on the CMAP build up abatement system at the request of the South Carolina Department of Health and Environmental Quality. The potential VOC emission rate from eleven CMAP machines was simulated to challenge one adsorber/desorber and the thermal oxidizer. The operating permit requires that AVX monitor the following parameters and ranges:

Required Parameter	Required Range
Adsorption pressure drop	2.0 – 5.0" H_2O
Desorption temperature	350 – 500 deg F
Thermal oxidizer temperature	1400 – 1800 deg F

During the source test, the average pressure drop was 3.2" water, average desorption temperature was 420^{O} F, and average thermal oxidizer temperature was 1500^{O} F. All parameters were within their respective range requirement and the subsequent resulting control efficiency was greater than 99%. Based on these results, AVX proposes the permitted parameters and indicator range for proper operation of the CMAP build up abatement system.

6. Performance Criteria

Representative Data – Acquisition of representative data is assured by the system's existing Data Acquisition and Handling System (DAHS).

Quality Assurance and Control Procedures – Current procedures include daily inspections of:

- Adsorber inlet pressure
- Airlift blower pressure
- Adsorber hopper BAC level
- Fluidization appearance on trays
- Check all site glasses for BAC (adsorber, desorber, overflow)
- Desorber temperature profile
- Desorber electrical profile

Any maintenance performed (periodic or repair) on the system devices is documented and maintained onsite. The system is also equipped with parametric alarms at the unit and at the control room CPU.

Monitoring Frequency – As specified in the operating permit, the thermal oxidizer shall be equipped with continuous temperature gauge, requiring daily recording. The control system is equipped to continuously monitor all parameters (pressure and temperature), with daily recordings of each.

Data Collection Procedure – The parametric data is recorded in the DAHS.
Data Averaging Period – The averaging period is every 5-mintes.

7. Performance Test Data

As previously indicated, a source test was conducted on the CMAP build up VOC control system on February 26, 2009. The system successfully met the operating permit requirements. The air permit does not require regularly scheduled stack emissions testing for compliance demonstrations.

8. Implementation Plan

The parametric monitoring system are already installed and in operation and in compliance with the operating permit.

TABLE 1

Compliance Assurance Monitoring Plan Summary
VOC Emissions From Adsorber/Desorber/Thermal Oxidizer
CMAP Build Up

I. Background

A. Emissions Unit

Description:	24 CMAP Build Up Machines
Control:	2 – 5,000 cfm adsorber/desorbers
	1 – 14,000 cfm adsorber/desorber
	1 – 1.0 MMBtu/hr thermal oxidizer
Facility:	AVX Corporation
	Myrtle Beach, South Carolina

B. Applicable Regulation

Regulation No.:	N/A
Regulated Pollutant:	VOC
Emission Limit:	N/A

II. Monitoring Approach

The key elements of the monitoring approach for PM compliance, including indicators to be monitored, indicator ranges, and performance criteria are presented below:

Item	Description
1. Indicator	1. Adsorber ΔP
	2. Desorber Temperature
	3. Thermal Oxidizer Temperature
2. Indicator Range	1. 2" – 5" H_2O
	2. 350 – 500 degrees F
	3. 1400 – 1800 degrees F
3. Performance Criteria	
a. Representative Data	40 CFR 60, Appendix B, PS-1
b. Verification of Operational Status	DAHS
c. Quality Assurance and Control Practices	Routine inspection and repair
d. Monitoring Frequency	Every 10-seconds
e. Averaging Period	Every 6-minutes
e. Data Collection Procedure	Continuously recorded in DAHS
f. Recordkeeping	Records are maintained on file (hard copy or electronic) for a period of 5 years
g. Reporting	Quarterly Emissions Reports
	Semi-annual Compliance Reports
	Annual Compliance Certification
h. Frequency of Reporting	Quarterly, Semi-annually, Annually