*****Replicable Testing Procedures*****

3M, St. Paul Minnesota (Specialty Tape Products industry)
- capture efficiency, destruction efficiency parameters

Process Description:
Emissions Monitoring Technique:
Emissions Calculation:
Pollutant Control Technique:

Process Description: The 3M permit includes specific replicable testing requirements related to Capture and Destruction Efficiency Testing for the thermal oxidizer (see Attachment 3) and Performance Specifications and QA/QC for THC CEMS (see Attachment 6).

ATTACHMENT 3
Capture and Destruction Efficiency Testing Plan

A. Capture Efficiency Testing for REECO Thermal Oxidizer on Building 23 and Building 20

The capture efficiency testing for the REECO thermal oxidizer shall be performed as follows.

1. The pollutant being measured is VOC.

2. The purpose of the capture efficiency tests is to determine what percentage of the VOC used by the coaters is controlled by the REECO thermal oxidizer.

3. The protocol to be used is described in the attached documents labeled F.2, G. 2, and T and 'is referred to by the U.S. EPA as Protocol lc Option A. For Building 23, the protocol calls for measuring the background concentration and the flow rate and VOC in six gas streams. The six gas streams consist of the four uncontrolled gas streams exiting through the following exhausts:

> the room exhaust (D section air balance),
> 1D alkabize,
> 2D hopper exhaust, and
> 4D primer dryer,

and the two controlled gas streams entering the REECO thermal oxidizer, one located just prior to the duct where the 8F foamer exhaust enters the main duct to the REECO and one coming from Building 22.

For Building 20, 19X area, the protocol calls for measuring the background concentration and the flow rate and VOC in two gas streams, the uncontrolled emissions exiting through the 19X bay exhaust and the controlled gas stream entering the REECO thermal oxidizer just as it exits the 19X area.

4. The Permittee shall meet all the criteria of Procedure T for a temporary total enclosure for both Building 23 and the 19X enclosure in Building 20, except the requirement to have a distance of no less than four equivalent diameters from each natural draft opening to each emission unit.

5. Each test consists of three 3-hr runs.

6. The initial capture efficiency test will be performed on Building 23 and Building 20, 19X area, and the capture efficiency determined for Building 23 will be applied to Building 22. Future capture efficiency testing may be required on Building 22. The emission units in Building 23 are as follows:

1C coater and oven
2C coater and oven
2C jet dryer
3C coater and oven
3C primer dryer
3C LAB dryer
4C coater and oven
4C LAB dryer
4C primer dryer
1D oven .
1D Saturant
2D oven
3D oven
3D LAB
4D oven
1D alkabize and saturant
2D hopper
4D primer dryer
1C primer and LAB
2C primer dryer
3D primer dryer
5D LAB oven
1D saturant churns
D section air balance south
D section air balance north
5D oven
5D alkabizer
5D saturant churns
5D LAB

7. If the sample port where the VOC at the inlet to the REECO thermal oxidizer is being measured is between the 8F duct and the inlet to the oxidizer, the duct connecting 8F to the oxidizer will be blocked off during all capture and destruction efficiency stack testing.

8. The capture efficiency testing for Building 23 will be performed with all equipment listed in 6., above, operating normally during the test.

9. The capture efficiency testing for Building 20 will be performed under the following conditions.

- All doors and windows in the 19X enclosure must be closed.
- The 19X coater and oven shall be operated normally during the test.
- The sample port for the gas stream going to the REECO thermal oxidizer shall be located such that only VOC emissions from the 19X coater and oven will be measured.

10. The following operating parameters must be monitored and recorded during the capture efficiency testing:

- natural gas usage in the REECO thermal oxidizer,
- operating temperature of the REECO thermal oxidizer,
- type and quantity of products manufactured, both intermediate and final,
- raw materials used,
- VOC content of all products manufactured and raw materials used,
- production rate of each coater which was operating during the test,
- time that each coater is started up and shut down during the test.

11. The Permittee shall bring to the pretest meeting a plan for collecting and a format for recording the parameters described in 10., above.

12. Sampling port locations are as shown on the attached diagrams.

13. The capture efficiency is defined as the ratio of the controlled emissions to the sum of the controlled plus uncontrolled emissions. For the Building 23 capture testing, the controlled emissions are the emissions measured at the inlet to the thermal oxidizer minus the emissions from Building 22, and the uncontrolled emissions are the emissions measured at all other locations. For Building 20, the controlled emissions are the emissions measured at the inlet to the thermal oxidizer and the uncontrolled emissions are the emissions measured at all other locations. Separate capture efficiency calculations shall be performed for Building 23 and Building 20.

14. The capture efficiency shall be determined by averaging the capture efficiency calculated for the current test and all previous independent third party capture efficiency tests that have been approved by the Agency. This average capture efficiency shall be used in the emission calculations required by Attachment 2 to this permit, except as allowed by section 15., below.

15. If the stationary source has been modified such that it may have affected the capture efficiency, the capture efficiency as determined by the tests after the modification shall be used in the emission calculations required by Attachment 2 to this permit.

16. If the results of the second capture efficiency test required by this permit vary by less than 10 percent from the first capture efficiency test required by this permit, capture efficiency testing may be performed every two years rather than every year.

17. All capture efficiency testing shall be performed by an independent testing company.

B. Capture Efficiency Testing for SB Oxidizer

1. The pollutant being measured is VOC.

2. The purpose of the capture efficiency test is to determine what percentage of the VOC used by the 5B coater is controlled by the oxidizer.

3. The protocol to be used is described in the attached documents labeled F.2, G.2, and T and is referred to by the U.S. EPA as Protocol lc Option-A. The protocol calls for measuring the background concentration and the flow rate and VOC in two gas streams, the uncontrolled emissions exiting through the room exhaust (B section air balance) and the gas stream entering the 5B oxidizer.

4. The capture efficiency is defined as the ratio of the controlled emissions to the sum of the controlled plus uncontrolled emissions.

5. The Permittee shall meet all the criteria of Procedure T for a temporary total enclosure, except the requirement to have a distance of no less than four equivalent diameters from each natural draft opening to each emission unit.

6. Each test consists of three 3-hr runs.

7. The capture efficiency testing will be performed under the following conditions.

- All VOC emitting equipment in Building 22 except the 5B coater must be shut down during the test
- The 5B coater shall be operated under non-optimum conditions, which will be defined no less than two weeks prior to the test.

8. The following operating parameters must be monitored and recorded during the capture efficiency testing:

- natural gas usage in the 5B oxidizer,
- operating temperature of the 5B oxidizer,
- type and quantity of products manufactured, both intermediate and final,

- raw materials used,
- VOC content of all products manufactured and raw materials used,
- production rate of the coater,
- time that the coater is started up and shut down during the test.

9. The Permittee shall bring to the pretest meeting a plan for collecting and a format for recording the parameters described in 8., above.

10. Sampling port locations are as shown on the attached diagrams.

11. The capture efficiency for the 5B coater shall be determined by averaging the capture efficiency calculated for the current test and all previous independent third party capture efficiency tests for the 5B coater that have been approved by the Agency. This average capture efficiency shall be used in the emission calculations required by Attachment 2 to this permit, except as allowed by section 12., below.

12. If the stationary source has been modified such that it may have affected the capture efficiency for the 5B coater, the capture efficiency as determined by the tests after the modification shall be used in the emission calculations required by Attachment 2 to this permit.

13. All capture efficiency testing shall be performed by an independent testing company.

C. Destruction Efficiency for REECO Thermal Oxidizer

1. For the initial test after issuance of this permit, the destruction efficiency testing for the REECO thermal oxidizer shall be performed concurrently with the capture efficiency testing for the REECO thermal oxidizer using the appropriate U.S. EPA test methods.

2. For the initial destruction efficiency test following the issuance of this permit, 16 runs will be performed. The three runs performed concurrently with the capture testing will be 3-hr runs, the remaining 13 runs will be l-hr runs. All subsequent testing will consist of three l-hr runs.

3. Sampling port locations are as shown on the attached diagrams.

4. A minimum of one of the three runs for each destruction efficiency test will take place when fever than six coaters are operating.

5. The destruction efficiency shall be determined by using the following equation:

destruction efficiency = X - t * [s / (n)1/2]

Where:

X is the sample average,
n is the number of samples,
s is the sample standard deviation,
and t is the value from the t distribution using n-1 degrees of freedom and a 95% confidence interval

At least sixteen' samples will be collected during the first test after the issuance of this permit. As more data becomes available, it will be included in the calculation above.

6. The duct connecting 8F to the REECO thermal oxidizer will be blocked off during all destruction efficiency stack testing on the REECO thermal oxidizer.

7. All destruction efficiency testing will be performed under normal operating conditions, unless it is requested by the Division Manager that a test be performed under different operating-conditions.

8. All destruction efficiency testing shall be performed by an independent testing company.

<u>D. Destruction Efficiency for 5B Oxidizer</u>

1. For the initial test after issuance of this permit, the destruction efficiency testing for the 5B oxidizer shall be performed concurrently with the capture efficiency testing for the 5B oxidizer using the appropriate U.S. EPA test methods.

2. For the initial destruction efficiency test following the issuance of this permit, 16 runs will be performed. The three runs performed concurrently with the capture testing will be 3-hr runs, the remaining 13 runs will be l-hr runs. All subsequent testing will consist of three l-hr runs.

3. Sampling port locations are as shown on the attached diagrams.

4. All destruction efficiency testing will be performed under non-optimum conditions, which will be defined no less than two weeks prior to the test.

5 . All destruction efficiency testing shall be performed by an independent testing company.

<u>E. Retention Time Testing</u>

The Permittee shall determine the retention time. (the actual flow rate exiting the oxidizer divided by the volume of the oxidizer) for each oxidizer during the initial destruction efficiency testing and every two years thereafter.

ATTACHMENT 6
Performance Specifications and QA/QC for THC CEMS

PART 6A - PERFORMANCE SPECIFICATIONS FOR VOLATILE ORGANIC COMPOUND CONTINUOUS EMISSION MONITORING SYSTEMS IN STATIONARY SOURCES.

1. Applicability and Principle

1.1 Applicability

1.1.1 These requirements apply to continuous emission monitoring systems (CEMS) that measure volatile organic compound (VOC) emissions. The analyzer may operate by flame ionization detection (FID), photoionization detection (PID), nondispersive infrared (NDIR) absorption or other detection principles that respond to VOC levels. The requirements include procedures to evaluate the acceptability of the CEMS at the time of its installation and whenever specified in regulations or permits. The procedures evaluate CEMS performance at the time of installation and not over an extended period of time. Quality assurance procedures for calibrating, maintaining and operating the CEMS properly at all times are given in Part 6C.

In most cases, VOC monitors provide only a measure of the relative concentration level of a mixture of organics, rather than quantitation of the organic species present. This trait necessitates the use of VOC CEMS more as a relative indicator than a conventional emissions monitor. However, it may be possible to consider the VOC monitor as a conventional CEMS in some instances. These instances include cases where only one organic species is present, or where equal incremental amounts of each of the organic species present generate. equal instrument responses.

1.2 Principle. Calibration error, response time and performance audit tests are conducted to determine conformance of the CEMS with these specifications. The requirements include specifications for installation and measurement location, equipment and performance, and procedures for testing and data reduction.

2. Definitions

2.1 Instrument Range. The minimum and maximum concentrations that can be measured by a specific instrument. The range statement often assumes the minimum to be zero and expresses the range only as the maximum.

2.2 Instrument Span or Span Value. Full scale range of interest.

3. Installation and Measurement Location Specifications

3.1 CEMS Installation and Measurement Locations. Same as in Section 3.1 of Part 68. The CEMS shall be installed in a location where measurements give representative indication of the source's emissions.

3.2 Stratification Test Procedure. To determine whether VOC stratification exists, use a dual probe system as follows: Measure the VOC concentration at each traverse point according to Method 1 (40 CFR Part 60, Appendix A) with one probe and the VOC concentration at the stack or duct centroid with the other probe. Alternately measure 5-minute VOC concentrations at each traverse point and at the centroid. Normalize the data using the measurements at the centroid. Then calculate the deviation of the VOC concentration at each traverse point from the overall average. The installation location is unacceptable if the VOC concentration deviation at any point more than two inches from the duct or stack wall exceeds 10 percent. If the location is acceptable, then locate the CEMS probe at a point of average concentration that is within or closest to the centraloid area.

4. CEMS Performance and Equipment Specifications

4.1 Presurvey Sample Analysis. Use Method 18 (40 CFR 60, Appendix A),process chemistry, or previous studies to determine at least 90 percent of the VOC components in the effluent stream. Then select an appropriate CEMS for measuring the VOC. If applied in highly explosive. areas, exercise caution in choosing and installing the CEMS.

4.2 Sampling System. Unless the source owner or operator can demonstrate otherwise to the satisfaction of the Permitting Authority, the sampling system shall require heating to maintain the temperature of the sample gas above 150°C (300°F) throughout the system. This means heating all system components such as the probe, calibration valve, filter, sample lines, pump and the analyzer to prevent moisture from condensing. In addition, the sampling system shall include an in-stack or heated out-of-stack filter.

4.3 Instrument Span. For a CEMS intended to measure uncontrolled emissions, the instrument span must be between 1.1 and 1.3 times the average potential emission. For a CEMS installed to measure controlled emissions or emissions that comply with an applicable regulation, the instrument span must be between 1.5 and 2 times the level of the emission limit.

4.4 Calibration Gases.

4.4.1 Zero Gas. High purity air with less than 0.1 ppm by volume of hydrocarbons as methane or carbon equivalent or less than 0.1 percent of the span, whichever is greater.

4.4.2 Upscale Calibration Gases. Same as in Section 4.1.3 in Part 6B. Have the manufacturer of the cylinder provide a recommended shelf life for each calibration gas cylinder over which the concentration does not change by more than two percent from the certified value. Prepare mid-level (40 to 60 percent of span) and high-level (80 to 100 percent of span) calibration gases by source type containing the following components:

4.4.2.1 Process Source. Use the VOC components in the same proportion that make up 90 percent of the VOCs in the effluent stream.

4.4.2.2 Combustion Source. Use propane gas.

4.5 Performance Audit Gas. A certified EPA audit gas shall be used, when possible. A Protocol 1 gas mixture within the calibration range may be used when EPA performance audit materials are not available.

4.6 Data Recorder Scale. The strip chart recorder, computer or digital recorder must be capable of recording all readings within the CEMS measurement: range and shall have a resolution of 0.5 percent of span.

4.7 Response Time. The response time for the CEMS must not exceed two minutes to achieve 95 percent of the final stable value.

4.8 Calibration Error. The CEMS must allow the determination of daily CE at all three calibration levels. For the initial 7-day CE test, the CEMS calibration response must not differ by more than 5 percent from the calibration gas value at each level after each 24-hour period.

4.9 Performance Audit Specification. The instrument relative error shall be less than or equal to 10 percent.

4.10 Measurement and Recording Frequency. The sample shall flow continuously through the measurement section of the analyzer. The detector shall measure the sample concentration at least once every minute, and the data acquisition system shall compute and record from these determinations an average hourly VOC concentration.

5. Performance Specification Test (PST) Periods

5.1 Pretest Preparation Period. Install the CEMS, prepare the test site according to the specifications in Section 3, and prepare the CEMS for operation and calibration according to the manufacturer's written instructions. To verify the operational status of the CEMS, the owner or operator should conduct a pretest conditioning period similar to that of the 7-day CE test.

5.2 7-day CE Test Period. Same as in Section 4 of Part C.

5.3 Response Time Test Period. Conduct the response time test once during the 7-day CE test period and quarterly thereafter.

5.4 Performance Audit Test Periods. Conduct the performance audit once during the initial CE test and quarterly thereafter.

6. Performance Specification Test 'Procedures

6.1 7-day CE Test.

6.1.1 Sampling Strategy. Conduct the 7-day CE test at 24-hour intervals for seven consecutive days following Section 4 of Part 6C, except determine CE at the specified three levels.

6.1.2 Calculations. Summarize the results on a data sheet. Average the differences between the instrument response and the certified cylinder gas value for each gas. Calculate three CE results according to Equation 1 of Section 4.3 of Part 6C. The CE calculations do not use a confidence coefficient.

6.2 Response Time. Same as in Section 5 of Part 6C.

6.3 Performance Audit.

6.3.1 Testing Strategy. Conduct the performance audit following the daily calibration of the instrument. Introduce the audit gases into the sampling system at the sampling probe. The gas shall pass through all CEUs components used during normal sampling.

6.3.2 Calculation. Calculate the CEUs relative error using the following Equation 1:

$$RE = \frac{C_m - C_a}{C_a} \times 100$$

where: RE = Relative error of the performance audit test, percent.

C_m = Average CEUs response, ppm.

C_a = Audit gas reference value, ppm.

PART 6B - GENERAL EQUIPMENT, INSTALLATION AND CALIBRATION GAS SPECIFICATIONS FOR ENHANCED MONITORING PROTOCOLS

1. Introduction

This part covers the equipment, installation and (if applicable) calibration gas specifications for an enhanced monitoring protocol (EMP). A EMP may include a continuous emission monitoring system (CEMS); a continuous parameter monitoring system (CPMS); a continuous flow rate monitoring system (CFRMS); raw material or product testing and material usage recordkeeping or a combination of these techniques.

2. Equipment Specifications

2.1 CEMS EMPs.

2.1.1 The CEMS includes the pollutant (e.g. SO2, VOC or NOx)concentration monitor and the data acquisition and handling system (DAHS). The design of the equipment shall allow for checking the entire system for sample line losses and calibration changes. The pollutant monitor and DAHS must be able to measure and record information over the measurement span. In addition, the CEMS must allow the detection of changes in the instrument calibration and applicable accuracy requirement.

2.1.2 The design of the pollution concentration monitor shall include an injection port for calibration gases to check all components of the entire measurement system. The components include, as applicable, sample lines, filters, scrubbers, conditioners and as much of the probe as is practicable. For extractive monitors, the injection port must be at a point no closer to the analyzer than the back of the probe. For dilution probe equipped monitors, the injection port must be placed before dilution occurs to allow a check of the dilution system. For eductor or aspirator equipped monitors, the injection port must be before the port for the sample slip stream.

2.2 Continuous Parameter Monitoring System (CPMS) or Continuous Flow Rate Monitoring System (CFRMS). The CPMS or CFRMS includes the parameter or flow sensor and the DAHS. The design of the equipment shall allow for checking the entire system for calibration changes, which affect measurement accuracy and precision. The CPMS and CFRMS must be able to measure and record information over the measurement span. In addition, the CPMS or CFRMS must allow the detection of changes in the instrument calibration and applicable accuracy requirement.

2.3 Calibration Error (CE) Determination. The design of the EMP must allow determinations of CEs, positive or negative, at the low and high measurement levels. For a CEMS, daily determinations are required and are done using the calibration gas injection ports. For CFRMS, daily determinations are required. For a CPMS, determinations shall be conducted prior to CPMS installation. Thereafter, CE determinations for a CPMS shall be as frequently as practicable. If the EMP automatically adjusts (mechanically or electronically) the calibration, the EMP must record: (a) the amount of adjustment in measurement units(i.e., the difference of data output before adjustments from the reference value); or (b) the output in measurement units before calibration adjustments to allow the determination of the amount of adjustment in the measurement units.

2.4 Data Acquisition and Handling system. The DAHS 'must record the desired data over the range of operation. The DAHS must allow the detection of changes in the instrument calibration and applicable accuracy requirement.

2.5 Measurement Frequency. Refer to Section 2 of Part 6A.

3. CEMS installation and Measurement Locations Specifications Sections 3 and 4 are primarily for a CEMS and, as applicable, a CFRMS. Where an EMP is composed of a combination of parameter measurements, periodic sampling, and recordkeeping, locations and measurements are to be finalized as they are verified through the validation demonstrations of Part 6C. These specifications assure that the EMP will provide measurements that are representative of the source's compliance status with emission limitations or standards. Representativeness is defined by the performance verification test procedure (see Part 6C). These specifications are guidelines, except for those cases where reference method (RM) tests are not required.

3.1 Installation. Install the CEMS, CFRMS, or components of the EMP in allocation where the measurements are representative as defined in Part 6C. Several other factors determine the optimum location. These include ease of access for calibration, quality control (QC) checks, maintenance, readability and the degree of sample conditioning required. The location should be as free from in-leakage influences as possible. For CEMS, the exhaust gas sample location should be at least two equivalent duct diameters downstream from the nearest control device, point of pollutant generation, or other point at which a change in the pollutant concentration or emission rate occurs and at least 0.5 diameter upstream from the exhaust or control device. Method 1 of 40 CFR 60, Appendix A, provides the equation for calculating the equivalent duct diameter.

3.2 Stratification Check. Pollutant concentration or flow rate stratification may cause the selection of nonrepresentative locations. Therefore, the source owner or operator should check the location for possible stratification before installing the CEMS, CFRMS or exhaust gas parameter instrumentation. Note: Some performance specifications may not have a relative accuracy specification. If this is the case, the installation specification shall require a stratification check and allow only locations that provide representative measurements (i.e., nonstratified locations).

4. CEMS Calibration Gas Specifications

4.1 Calibration Gases. Gases used for initial and quarterly 3-point CE tests shall be any of the following:

4.1.1, Standard Reference Materials (SRMs). These calibration gases maybe obtained from the National Institute of Standards and Technology (NIST), Gaithersburg, HD 20899 (301/975-2208; Fax 301/975-2183).

4.1.2 Certified Reference Materials (CRMs) See "A Procedure for establishing Traceability of Gas Mixtures to Certain National Bureau of Standards Standard Reference Materials," joint publication by NBS [now NIST] and EPA [EPA-600/7-81-010, available from the U.S. Environmental Protection Agency, Quality Assurance Division (HD-77), Research Triangle Park, NC 277111.

4.1.3 EPA Traceability Protocol No. 1 Gases. See Citation 1 of the bibliography.

4.2 Concentrations. Three levels of concentrations shall be used: low, mid and high.

4.3 Dilution Systems for Calibration Gases. Gas dilution systems may be used if their operation is consistent with the protocol distributed through the EPA Emission-Measurement Technical Information Center entitled "Verification of Gas Dilution Systems for Field Instrument Calibrations," by Rima Dishakjian. A copy of the protocol may be obtained by calling (919)541-0200 and asking for EHTIC CTH-007(April 2, 1991).

5. Bibliography

1. “Traceability Protocol for Establishing True Concentrations of Gases Used for Calibration and Audits of Continuous Source Emission Monitors (Protocol Number I)," June 1978. Section 3.0.4 of the Quality Assurance Handbook for Air Pollution Measurement Systems. Volume III. Stationary Source Specific Methods. EPA-600/4-77-027b. U.S. Environmental Protection Agency. Office of Research and Development Publications, 26 Vest St. Clair Street, Cincinnati, Ohio 45268.

PART 6C - GENERAL PERFORMANCE VERIFICATION TEST PROCEDURES FOR AN ENHANCED MONITORING PROTOCOL

1. Introduction

This part provides (a) the procedures to be used by an owner and operator for validating the representativeness of an Enhanced Monitoring Protocol(EMP) to emission standards or limitations and (b) performance verification procedures for continuous parametric monitoring systems (CPMS), continuous emission monitoring systems (CEMS), continuous flow rate monitoring systems(CFRMS) or a combination of these systems used in EMPs. All EMPs proposed in a permit application by a source owner and operator shall include validation of the representativeness of the EMP to the emission limitations or standards.

2. Reference Method (RM) Test Location. The reference method testing locations for EMP validation may include stacks, ducts, application or storage containers for coatings, leak detection procedures or other appropriate sampling locations. Where exhaust gas emission testing is necessary to validate the EMP, the following requirements shall apply to the EMP performance verification demonstration:

2.1 Measurement Location. The RM location must provide a representative measurement. of the source emissions or effluent flow rates. The location must be (1) accessible, (2) at least two equivalent diameters downstream from the nearest control device or other point at which a change in the pollutant concentration or flow rate may occur, and (3) at least one-half equivalent diameter upstream from the effluent exhaust. A source owner or operator may select other locations if the Permitting Authority is satisfied that the locations provide are presentative measurement over the stack or duct cross-section. For example, the data from a stratification test may be satisfactory to justify using one measurement point. The EMP (as appropriate) and RM measurement locations need not be coincident.

2.2 Relative Accuracy (RA) Traverse Points.

2.2.1 Gas Concentrations. For gas concentrations, locate three traverse points at 16.7, 50.0 and 83.3 percent of a "measurement line" that passes through the centroid. If the location of this measurement line affects the EMP measurements, the tester may displace the measurement line by up to 12 inches (or 5 percent of the equivalent diameter of the cross-section, whichever is less) from the centroidal area. Conduct the RM measurements within an inch (but no less than an inch from the stack or duct wall) of the three traverse points.

2.2.2 Effluent Flow Rates. Locate the traverse points according to Method 1 of 40 CFR Part 60, Appendix A.

3. Test Periods

3.1 Pretest Preparation Period. The source owner and operator shall identify the test site and demonstration procedures according to the general specifications in Section 2, and prepare the EMP (as appropriate) for operation and calibration according to the owner, operator and manufacturer's written instructions as specified by the source owner or operator in the EMP.

3.2 Operating Conditions for RA and EMP Validation Testing. The source owner and operator shall conduct the RA evaluation and demonstration of representativeness testing during periods specified by the source owner and operator as representative of the affected emission unit's normal operating conditions as specified in the permit and approved by the permitting authority.

3.3 CEMS and CFRMS. The source owner and operator shall ensure that the following general provisions are met in addition to other requirements as specified by the permitting authority.

3.3.1 7-day CE Test Period. While the affected facility is operating under normal permitted operating conditions, determine the CE of the EMP at 24-hour intervals for seven consecutive days according to the procedure given in Section 4.1. All CE determinations must be made following a 24-hour period during which no unscheduled maintenance, repair or manual adjustment of the EMP took place. Where periodic automatic or manual adjustments are made routinely to the EMP zero and calibration settings, conduct the CE test immediately before these adjustments, or conduct it in such a way that the longest period of no adjustment can be measured. If the emission unit is taken out of service during the test period, record the onset and duration of the downtime and continue the CE test when the unit resumes operation.

3.3.2 Three-Point CE Test and Response Time Test Periods. Conduct the three-point CE and response time tests once during the initial 7-day CE test period of the EMP.

3.4 CPMS. The source owner and operator shall demonstrate and validate there presentativeness of the parameter monitoring system EMP in accordance with the following requirements and those additional requirements specified by the permitting authority.

3.4.1 The test period of the parameter monitoring system for the EMP shall consist of the operation period during which the parameter system output (e.g., representative emission level as represented by the parameter monitoring system) is directly compared to RM emission levels during a correlation test (see Section 6, Relative Accuracy Test, below) comprised of a minimum series of three emission test runs or samples.

3.4.2 The operation of the parameter monitoring system EMP shall be uninterrupted during the test period. During this period, there will be no unscheduled maintenance, repair or adjustment of the EMP.

3.5 Periodic Material Sampling, Recordkeeping and Multiple Point Monitoring. An EMP which relies on a combination of periodic material sampling and analysis, and material use recordkeeping procedures must include demonstration of its known relationship to the permitted emission limitations (e.g., ink VOC content and gallons used to determine VOC emission in pounds per day). Multiple point monitoring protocols must utilize appropriate measurement technique procedures. Examples of appropriate measurement technique procedures are: Method 9 of 40 CFR Part 60, Appendix A, for opacity and particulate emission limitations; Method 21 of 40 CFR Part 60, Appendix A, for VOC leak detection and repair programs; use of emission factors; and a demonstrated relationship between production and emissions.

3.6 If the above test periods are interrupted because of EMP failure, restart the entire test when the EMP becomes operational.

4. Calibration Error (CE) Test

4.1 7-day CE Test Procedure. Determine the magnitude of the CEs at the low- and high-level values once each day (at 24-hour intervals) for seven consecutive days. For EMPs described in Section 3.5, the 7-day test shall consist of an as-tested emission level comparison of the specified RM values and the predicted emission level of the EMP. Before making any periodic automatic or manual adjustments to the CHS zero and calibration settings, determine the CE at the low- and high-measurement levels of the EMP. Record the CHS responses of each (i.e., the output from the data recorder).

4.2 3-Point CE Test Procedure. Determine the CE at the low-, medium- and high-measurement levels three nonconsecutive times at each measurement point. Operate the EMP in its normal sampling, analysis and data recording mode as nearly as possible. Record the EMP responses (i.e., the output from the data recorder or DAHS). To demonstrate sampling system integrity, conduct these tests after a conditioning period of at least one hour of parametric, emission or flow measurements.

4.3 Calculations. Summarize the results on a data sheet. Average the differences between the instrument responses and the certified calibration values. For an EMP which is comprised of parameters, periodic sampling and analyses and material use recordkeeping, the differences between the specified reference method values and the predicted EMP values shall be used for the overall CE evaluation. Calculate the CE results according to Equation 1. The CE calculation does not use a confidence coefficient.

Equation 1:

$$CE = \frac{(R_m - R_v)}{R_v} \times 100$$

where: CE = Calibration error of the CHS, percent
R_m = Average CHS response.
R_v = Reference value.

5. EMP Response Time Test

5.1 Continuous Emission Monitoring System (CEMS). The source owner and operator shall conduct existing performance specification test requirements (e.g., 40 CFR Part 60, Appendix B). The source owner and operator shall conduct the following requirements for the proposed EMPs. Conformance with existing requirements may be used at the discretion of the Administrator as demonstrating conformance with these requirements.

5.1.1 Introduce the calibration gases through the injection port. For time-shared systems, use the system with the shortest cycle mode and with the longest line from injection to the analyzer (this may involve two systems). Introduce the low-level gas into the system. When the system output stabilizes (no change greater than one percent of full scale for 30 seconds), switch to monitor stack effluent and wait for a stable value. Record the time required (upscale response time) from the moment of switching until 95 percent of the final stable value is achieved.

5.1.2 Next, introduce the high-level gas and repeat the above procedure. Record the time (downscale response time) required from the moment of switching until 95 percent of the final stable value is achieved.

5.1.3 Repeat the entire procedure three times and determine the mean upscale and downscale response times. The longer of the two means is the system response time.

5.2 CPMS and CFRMS. In most cases, these monitors have such rapid response times that a response time test is not necessary. The source owner or operator shall evaluate each monitor and provide justification to the Permitting Authority that a response time test is not necessary.

5.3 Other EMPs. The source owner or operator shall demonstrate to the permitting authority's satisfaction that the system produces a valid output that represents the emissions unit's emission level, considering averaging time, within the specified response time of the emissions unit’s operating permit.

6. Relative Accuracy Test

The source owner and operator shall provide a determination of the relative accuracy of the EMP with respect to the emission limitation or standard. The relative accuracy determination shall form the basis for identification of the known relationship of the EMP to the permitted emission limitation or standard. The confidence in the recorded and reported compliance status shall include the incorporation of the uncertainty in the data as reflected by the demonstrated relative accuracy (e.g., and EMP output in terms of an emission limitation or standard shall include the raw output number plus the absolute RA value adjustment). Optimally, the RA determination should result in an EMP that is very accurate (e.g., a level such that the raw number plus the RA is less than the standard). The demonstrated RA also shall be used by the source owner and operator to establish the range of indeterminate compliance identified in Section 7.

6.1 Performance Verification Methods. The permitting authority and the performance specifications of this part specify the reference methods (RM) for the RA tests (see Part 6A).

6.2 Number of RM measurements.

6.2.1 Conduct a minimum of nine sets of all necessary RM runs (e.g., coating analyses, pollutant, moisture, 02, etc.). Conduct each set between 30- and 60-minute intervals. The source owner or operator may choose to perform more than nine sets of RM runs. If more than nine RM runs are performed, the source owner or operator may reject a maximum of three sets of the test measurements as long as the total number used to determine the RA is equal to or greater than nine. All data, including the rejected data, must be reported.

6.2.2 The source owner and operator shall compare the EMP data output obtained (in terms of the emission limitation or standard) to the concurrent RM results as follows:

6.2.2.1 Non-variable CPMS. In some CPMS, the emission rate miscorrelated at "fixed" parameter levels. In these cases, conduct at least three measurements at the specified levels of these parameters. To support the specified allowable variations for these "non-variable" parameters, use empirical relationships based on previous studies or theoretical .relationships with sensitivity analyses.

6.2.2.2 Variable CPMS. Since RA testing is costly, a CPMS is practical if the number of variable parameters is minimal. Using the specified range of applicability, select at least three points over the range, and conduct at least three measurements of the RA test at each point. If the source owner and operator wishes to extend the CPMS applicability and relationships beyond the tested range, the source owner or operator must provide empirical data based on past studies .or predicted data based on theory to justify the extension.

6.3 Correlation of RX and EMP. The source owner and operator shall conduct the specified RM measurements to obtain results representative of the emissions from the affected emission unit and to correlate the results to the output data of the EMP. Hark the beginning and end of the test period and each RM measurement (including the exact time of day) on the individual chart recorder(s) or other permanent recording device(s) for the EMP recorder. Take into account appropriate response times.

6.4 Calculations.

6.4.1 Arithmetic Mean (a). The source owner and operator shall calculate, record and report d of the difference of a paired EMP and RM data set using Equation 2. If applicable, correct the data for moisture.

$$\text{Equation 2:} \quad \bar{d} = \frac{1}{n} \sum_{i=1}^{n} d_i$$

where: n = Number of data pairs.

$\sum_{i=1}^{n} d_i$ = Algebraic sum of the individual differences d_i between the pair of EMP and RM values.

6.4.2 Standard Deviation (Sd). The owner and operator shall calculate, record and report Sd using Equation 3.

$$\text{Equation 3:} \quad S_d = \sqrt{\frac{\sum_{i=1}^{n} x_i^2 - \frac{\left[\sum_{i=1}^{n} x_i\right]^2}{n}}{(n-1)}}$$

6.4.3 Confidence Coefficient (CC). The source owner and operator shall calculate, record and report the 2.5 percent error CC (one-tailed)using Equation 4.

$$\text{Equation 4:} \quad CC = t_{0.975} \frac{S_d}{\sqrt{n}}$$

where : t0.975 = t-value (see Table 1)

Table 1. t-Values

n[a]	$t_{0.975}$	n[a]	$t_{0.975}$	n[a]	$t_{0.975}$
2	12.706	7	2.447	12	2.201
3	4.303	8	2.365	13	2.179
4	3.182	9	2.306	14	2.160
5	2.776	10	2.662	15	2.145
6	2.571	11	2.228	16	2.131

[a] The values in this table are already corrected for n-1 degrees of freedom. Use n equal to the number of' individual values.

6.4.4 Relative Accuracy. The source owner and operator shall calculate, record and report the R4 of the set of data using Equation 5.

$$RA = \frac{|\bar{d}| + |CC|}{\overline{RM}} \times 100$$

where:

$|\bar{d}|$ = Absolute mean of the differences (Equation 2).
CC = Confidence coefficient (Equation 4).

$\overline{RM}$ = Average reference value or applicable standard.

6.5 Notes. If the 3-point RM result differs greatly from the CEMS or CFRMS result, make a 1-point RM measurement close to the CEMS or CFRMS measurement point to check for stratification. Agreement between the 1-point R. result and the CEMS or CFRMS result would indicate that stratification might exist; therefore, relocate the CEMS or CFRMS measurement point to a point of average value. If there is disagreement, the cause for the high mean difference might be significant losses of pollutant in the sample lines. A way to check for line losses is to calibrate the CEMS or CFRMS at the analyzer and through the probe and compare the results. Other causes of high mean differences include erroneously labeled calibration gases, interferences and errors in conversion factors or assumed-values (e.g., moisture content) used in calculations. Also, check NO_x CEMS for NO_2 losses.

PART 6D - GENERAL QUALITY ASSURANCE PLAN FOR ENHANCED MONITORING PROTOCOL

1. Introduction

The quality assurance (QA) plan is the basis for assessing and maintaining the quality of data for the Enhanced Monitoring Protocols (EMPs). Good quality EMP data is essential since EMP data will be used for certifying compliance with permitted emission limitations or standards. A quality assurance plan has two functions: (1) assessment of the quality (accuracy and precision) of the EMP data, and (2) quality control (QC), which involves activities to maintain or improve data inquiry. Both functions form control loop. When accuracy or precision is unacceptable, QC must increase until the quality of the EMP data is acceptable.

2. Basis Elements of a QA Plan

The quality assurance plan must include a program of frequent (e.g., daily)and less frequent (e.g., quarterly and annual) checks of the EMP. Quality control programs used for the certification of emissions and EMP output verification may include daily, quarterly and annual evaluations. Such programs are not limited to just instrumental sampling and analysis, but also quality assessments of material inventories used for establishing affected unit emissions. The rigorousness and frequency of assessment must be commensurate with the EMP and shall be proposed by the source owner or operator at the time of permit application for incorporation into the permit.

2.1 Quality Control (QC) Checks and Error Assessments. QC checks and error assessments (e.g., temperature and pressure recording devices have failed) shall be done daily, unless the permit applicant can justify less frequent assessments to the Permitting Authority.

2.1.1 For recordkeeping components of an EMP, the QC checks shall involve checking the data forms to see that all required information is recorded and the information is recorded correctly.

2.1.2 For an EMP that involves instrumental measurements, the QC checks shall describe the procedure for checking the calibration error of each instrument at the zero (low) and span (high) levels. Alternatives may be used subject to the approval the Permitting Authority.

2.1.3 The criteria for excessive error, i.e., when the EMP's data are invalid (e.g., outside performance specifications including recording of insufficient information), shall be stated in the QC plan. The plan owner or operator shall ensure that the beginning and ending times of the invalid data period are identified.

2.2 Data Accuracy Assessment. The QA plan must include procedures (e.g., calibration error, relative accuracy testing, inventory assessment, or fugitive emission assessment plan review) for a quarterly and annual assessment of the EMP's data accuracy and must specify the criteria for excessive error (e.g., does not meet the relative accuracy requirement, failed to statistically prove that leaks were less than one percent of all potential leaks).

2.3 Minimum Data Availability. The QA plan submitted by the owner or operator as a part of the EMP shall include an identification of the minimum periods (projected time if a new system) of EMP downtime associated with the quality control program.

2.4 Reporting and Recordkeeping. The. QA plan proposed by the owner or operator and approved by the permitting authority shall assure that the information necessary for conformance with Sections 2.5.5 of the permit and Attachment 2 are obtained and maintained. The plan should also include the following provisions as applicable to the QA plan for the EMP:

2.4.1 Recording of parameter data and downtime of the process and control systems and reasons for downtime.

2.4.2 Recording of reasons for deviations from the permitted operational conditions.

2.4.3 Recording of downtime, adjustments and repairs of EMP components or procedures.

2.4.4 Reviewing and editing of the EMP data.

3. Demonstration of Permitted Operational Condition

3.1 Demonstrating Permitted Operational Conditions. The owner or operator shall include procedures in the QA plan for demonstrating that a permitted operational condition correlates to compliance with the emission limitations or standards. An optimal demonstration for a parameter based EMP would be to verify through testing acceptable relative accuracy (RA) of the EMP at or near, but not in excess of, the permitted emission limitation or standard; then under normal operations, operate at parameters or monitored emission levels well below the emission limitation or standards.

4. Quality Assurance

4.1 QA Plan Organization. The source owner and operator shall submit a description of the QA plan. This document shall include, at a minimum, the following: (a) QA responsibilities (including maintaining records, preparing reports and reviewing reports) among the various departments, groups or individuals at the facility; (b) schedules for the daily checks, periodic audits, and preventive maintenance; (c) check lists, data sheets and a spare parts inventory; (d) preventive maintenance procedures specified by the monitor manufacturer; and.(e) description of the media, format and location of all records and reports for submission to the Permitting Authority.

4.2 QA Plan Revision. The QA plan shall include provisions for a review at least once a year of all data generated by the EMP. Based on the results of the annual review, the source owner or operator shall revise or update the QA plan, if necessary.

Emissions Monitoring Technique: 3M's flexible permit includes specific monitoring requirements for air pollution control equipment, as well as operational requirements and an operation and maintenance plan for the control equipment and boilers. Example language for the required monitoring can be found in sections 2.4.2.2, 2.4.2.3, and 2.4.3. One of the most significant monitoring issues for this facility was the requirement to install total hydrocarbon (THC) continuous emission monitors (CEMS) on all curing ovens. At the time the permit was issued (1993), the permit only included language about a CEMS survey – see section 2.5.5. Attachment 6 to the permit includes "Performance Specifications and QA/QC for THC CEMS".

2.4.2.2 Operational Requirements for Air Pollution Control Equipment and Boilers

During operation of the stationary source and air pollution control equipment, the Permittee shall:

1. maintain a minimum operating temperature of 1300°F, as a three-hour average, in the thermal oxidizer serving Emission Point No. 1;

2. for the thermal oxidizer serving Emission Point No. 1, maintain a minimum retention time of the combustion gases of one second;

3. shall maintain a minimum operating temperature of 1200°F, as a three hour, average in the 5B oxidizer;

4. for the 5B oxidizer serving Emission Point No. 2, maintain a minimum retention time of the combustion gases of 1 second;

5. maintain a minimum operating temperature of 1500°F in each of boilers 4, 5 and 6;

6. capture at least 68 percent by weight (or other percentage as determined through testing in Table E and changes made according to Attachment 3) of all VOC input to the equipment listed in emission point nos. 1 and 2 and vent it to either the thermal oxidizer controlling Emission Point No. 1 or the 5B oxidizer controlling Emission Point No. 2;

7. destroy at least 95 percent by weight (or other percentage as determined through testing in Table E and changes made according to Attachment 3) of all VOC vented to the oxidizer serving Emission Point No. 1;

8. destroy at least 95 percent by weight (or other percentage as determined through testing in Table E and changes made according to Attachment 3) of all VOC vented to the oxidizer serving Emission Point No. 2;

9. destroy at least 95 percent by weight (or other percentage as determined through testing in Table E and changes made according to Attachment 3) of all VOC vented to the boilers;
10. maintain the direction of the airflow at all openings to all coating, churn and mogul rooms into the coating, churn and mogul rooms, respectively;

11. if the direction of the airflow at any opening to any coating, churn or mogul room is not into the respective room, the Permittee shall perform all necessary actions to return the direction of the air flow into the coating, churn, or mogul room;

12. maintain the face velocity across all openings to all coating rooms at least at 200 feet per minute;

13. maintain the pressure drop across each filter within the range listed for that filter in the facility description section of this permit.

2.4.2.3 Monitoring Requirements for Air Pollution Control Equipment

1. The monitoring equipment for air pollution control equipment for this stationary source shall be operated at all times except during routine maintenance of the monitoring equipment or the air pollution control equipment. Such operation shall be in accordance with all permit conditions.

2. The Permittee shall operate all monitoring equipment for air pollution control equipment so as to maintain 95 percent up-time (including routine maintenance of the monitoring equipment or air pollution control equipment) based on quarterly reporting periods.

3. The Permittee shall conduct all necessary maintenance and make all necessary actions to keep all monitoring equipment for air pollution control equipment in proper operating condition at all times.

4. If all the following necessary monitoring equipment does not currently exist or is not currently operational at the stationary source, the Permittee must install or make repairs within 60 days of issuance of this permit. As a minimum, monitoring equipment shall include:

a. a temperature measuring device with hardcopy readout that continuously measures the operating temperature of the thermal oxidizer serving Emission Point No. 1;

b. a temperature measuring device with hardcopy readout that continuously measures the operating temperature of the oxidizer serving Emission Point No. 2;

c. monitoring devices that will continuously indicate the direction of the air flow at all entrances and exits to each coating, churn and mogul room;

d. a device to measure the flow of natural gas to each of the oxidizers controlling emission point nos. 1 and 2;

e. gages to measure the pressure drop across each filter.

2.4.3 Operation and Maintenance Plan

A complete and accurate table of contents of the operation and maintenance plan shall be submitted to the Division Manager within 60 days of the date of issuance of this permit. Upon receipt of the table of contents, the plan is an enforceable part of this permit. The plan shall be available on site for review by the Agency at any time after the submittal of the table of contents. The plan shall not be a copy of the equipment manufacturer's manual. It shall be a detailed plan prepared by the Permittee for this specific stationary source. The complete plan shall include as a minimum, the following information.

1. A preventative maintenance program for avoidance of excess emissions which shall include:

a. identification of the position(s) responsible for inspecting, maintaining and repairing the control equipment (including the thermal and 58 oxidizers) that will be inspected;

b. the frequency of these inspections or repairs; and

c. identification and quantities of the replacement parts which will be maintained in inventory for quick replacement.

2. An identification of operating conditions and outlet variables for the control equipment (including the thermal and 5B oxidizers) that will be monitored in order to detect a malfunction or breakdown, the normal operating range of these variables and a description of the method of detecting and informing operating personnel of any malfunction or breakdown, including alarm systems, lights and other indicators.

3. A description of the generic corrective procedures that will be taken in the event of a malfunction or breakdown in order to restore compliance with the applicable emission limitations and permit conditions as expeditiously as possible including, but not limited to, reducing the production rate.

4. A statement(s) of the time period(s) that would be required to safely shut down the stationary source or portion thereof causing excess emissions to the extent necessary to be in compliance with the permit conditions.

5. A description of the records that will be kept to show that the plan is implemented.

2.5.5 Continuous Emission Monitors (CEMS)

The Permittee shall submit to the Division Manager, the CEMS Survey attached to this permit as Exhibit B.l within 60 days of the effective date of this permit (or at least 30 days prior to any certification test, which ever is earlier).

The Permittee shall notify the Division Manager, in writing, of every scheduled CEMS certification test, at least 30 days before the test. At the same time, the Permittee shall request a pretest meeting with Agency staff.

The Permittee shall operate all continuous monitoring systems and 'associated equipment so as to maintain 90 percent up-time based on quarterly reporting periods.

Emissions Calculation: Section 2.4.6 of 3M's flexible permit covers "Emission Tracking and Calculation" – see example permit language given below.

2.4.6 Emission Tracking and Calculation

1. The Permittee shall track VOC emissions and calculate the daily VOC emissions from all emission units at the stationary source except the boilers but the VOC emission generated by the coaters and exhausted through the boilers must be included. Calculations of emissions for Sunday, Monday, Tuesday, and Wednesday must be completed no more than 41 hours after the end of the day for which the calculation is being made. Calculations of emissions for Thursday, Friday, and Saturday must be completed by 4:30 p.m. each Tuesday. Calculations of emissions for holidays must be completed by 4:30 p.m. of the second business day after the end of the holiday. This calculation shall be made in accordance with the methodologies in Attachment 2.
2. Attachment 2 is an enforceable condition of this permit and the Permittee waives any rights to dispute the contents of Attachment 2.
3. The methodologies in Attachment 2 may be changed by the Permittee through a written request from the Pemittee to the Agency. After the Agency approves the request, the changes become an enforceable part of this permit.

ATTACHMENT 2
VOC Emission Calculations

A. Emissions Calculation for Controlled Units

The Permittee will have a computer which is programmed to contain the following information and to perform the following steps. If the computer is not functioning to the extent that the required emission calculations cannot be completed, the Permittee shall follow the procedures described under part 10. and ll., below.

1. The computer contains a list of all raw materials used at the tape plant that contain VOC and their VOC-content.

2. The computer contains a list of the VOC content of all raw materials, intermediate and final products that contain any VOC.

3. A production report is generated every day that lists the products made and all the raw materials and intermediate products and quantities that went into each final product.

4. The list of all products made and raw materials and intermediates used that day is compared to the list referenced in 2., above and the computer determines which products made and which raw materials and intermediates used contain VOC. The amount of VOC used that day is determined by multiplying the amount of product made or raw material or intermediate used by the amount of VOC contained in each product, raw material or intermediate and by adding in a representative amount of clean up solvents.

5. For the 2B coater and oven, during operation of the solvent recovery system, the total amount of solvent used is multiplied by the capture efficiency to determine the amount of solvent that entered the oven. The amount of solvent recovered by the solvent recovery system and the amount of solvent that is emitted during oven purges are each subtracted from the amount of solvent that entered the oven. The remaining amounts that entered the oven is assumed to go to the thermal oxidizer and is multiplied by the factor: (1-destruction efficiency).

The emissions from oven purges are calculated by multiplying the number of purges that day by the emission factor of 15.3 pounds of VOC per purge.

The VOC emitted from the 2B coater and oven is the sum of the amount emitted by the thermal oxidizer from the 2B oven, the amount emitted during oven purges and the amount that was not captured by the oven.

6. If the VOC content of any shipment of VOC containing material varies by more than 5 percent of the specified average value for that material, the VOC usage of that material for that day shall be adjusted to reflect the actual VOC content of that shipment. This adjustment shall be made to the emission calculations within 14 days of the original emission calculation for that day.

7. The amount of VOC used is multiplied by the factor: (1- the overall control efficiency). This is the amount emitted of the specific VOC.

8. The overall control efficiency is equal to the capture efficiency multiplied by the destruction efficiency. There will be three capture efficiencies, one for Building 23 and 22, one for building 20 and one for the 5B coater. There will be two destruction efficiencies, one for the thermal oxidizer and one for the 5B oxidizer. The capture and destruction efficiencies shall be determined as specified in Attachment 3 to this permit, except as provided in 9., below.

9. Prior to Agency approval of the first capture and destruction efficiency tests performed after the issuance of this permit, the overall control efficiency is assumed to be equal to 64 percent.

10. If the computer is not functioning to the extent that the above emission calculation cannot be performed, the electronic recipes of planned schedules will be used in the place of the production report. The VOC emissions will be calculated by using the planned schedule and performing the calculations described in 4., 5., and 6., above without the use of the computer.

11. If the VOC emissions were calculated using the procedure in lo., above, the Permittee must calculate the actual VOC emissions for the time period for which the planned schedules were used. This must be completed no more than 7 days after the day for which the calculations were made.

12. The capture and destruction efficiencies for the thermal oxidizer serving emission point no. 1 shall be applied to the VOC used on coaters venting to the thermal oxidizer. The capture and destruction efficiencies for the 5B oxidizer shall be applied to the VOC used on the 5B coater.

B. Emissions calculation for uncontrolled units without continuous emission monitors (CEMS)

The Permittee will calculate VOC emissions from the following units which are not controlled and are not monitored by a CEMS:

Emission Point No.	Facility Stack No.	Description
47 and 48	24F and 24G	Two spray room exhausts
17	24H	4J extruder
16	24U	1J extruder
19	24Y	5J extruder
74-93	none	Aboveground Tank Nos. 1-5 and 8-16 and underground tank Nos. 1-6

The VOC emission for these units shall be determined as follows:

1. For the two spray room exhausts, the actual usage of VOC for each day shall be determined from the records required to be kept under Special Condition 2.4.5. The daily VOC emissions shall be equal to the daily VOC usage.

2. For the extruders, the daily VOC emissions shall be equal to the emission factor multiplied by the amount of raw material extruded that day, in appropriate units. The emission factor from the date this permit is issued until the date the performance test report for VOC on the extruders is approved shall be equal to 1.14 pounds of VOC emitted per ton of raw material input. On and after the date the performance test report for VOC on the extruders is approved, the emission factor shall be equal to the average number of pounds of VOC emitted during the performance test per ton of raw material processed during the test.

3. For the tanks, the daily VOC emissions shall be equal to 11 pounds per day. This is the total estimated annual VOC emissions divided by 365 and rounded.

<u>C. Emissions calculation for uncontrolled units with continuous emission monitors (CEMS)</u>

The Permittee will calculate emissions from all emission units which are continuously monitored by Total Hydrocarbon (THC) CEMS, as described in this section. Prior to the certification of the CEMS, the procedure in part 6., below, will be used, and any time thereafter, when any part of the CEM system becomes nonfunctional to the extent that the emissions cannot be calculated, the procedure in part 5., below, will be used.

1. The THC CEMS shall measure the relative concentration of a predetermined standard mixture of VOCs from the emission points indicated in Special Condition 2.5.5.1 of the permit. The output of the THC CEMS shall be in ppm and shall be combined with a predetermined air flow for each emission point to provide a final output from the Data Acquisition System (DAS) in lb/hr.

2. The Permittee shall prepare and submit a Total Hydrocarbon (THC) Continuous Emissions Monitoring (CEM) Plan within 30 days of permit issuance. This Plan shall be prepared using Attachment 6 as a guideline. The plan, when approved by the Division Manager, will become an enforceable part of this permit.

The plan shall include the following:

a. A description of the sampling sequence for the emissions points, and the frequency that each point will be sampled.

b. A description of the method for averaging individual ppm readings from each point into an overall daily average for the entire system, expressed in lb/hr.

c. The standard mixture of VOCs referred to in part 1 shall be evaluated through a Presurvey Sample Analysis. The Presurvey Sample Analysis shall be derived annually based on annual reported VOC usage for uncontrolled units (determined by January 30 for the preceding calendar year) which will be used to establish the base product formulation and component ratios that will be applied to the daily Total Hydrocarbon Counts provided from the CEMS. The base product formulation and component ratios will remain in effect until March 1 of the next year. The Permittee shall provide to the Agency a Presurvey Sample Analysis Report by March 1 of each year indicating:

i. The results of the analysis including the percentages of the VOC components in the effluent stream.
ii. A list of the raw materials used in the analysis.
iii. Justification for the choice of the materials used in the analysis.

d. A description of the VOC CEMS that will be used. This part shall describe the CEMS, including the sampling system, the calibration system, the analyzer, and the data acquisition system (DAS). This part shall justify the choice of the analyzer in consideration of the results of the Presurvey Sample Analysis. Also, the description of the DAS shall include the calculations it will make, the data it will store, and the reports it will generate.

e. The Presurvey Sample Analysis to be used for the first year of operation under this permit; this Presurvey Sample Analysis shall cover the time period from February 1, 1992, to January 31, 1993.

f. A QA/QC plan for the CEMS in accordance with Attachment 6.

g. A CEMS certification test plan for the THC CEMS.

h. Proposed changes in permit language resulting from approval of this plan. These changes shall be in a format specified by the Agency.

3. The exhaust flow rate for each stack being monitored by CEMS will be measured once each month. This measurement will be made using a velocity meter that has been calibrated according to the Special Condition 2.5.5.1 of this permit. The results of the monthly flow rate tests shall be submitted with the CEMS quarterly reports.

4. During the first year after the certification tests are conducted, the flow rate to be used in the emission calculation shall be the flow rate measured for each stack during the CEMS certification tests. From one year after the date that the original HPCA approvable certification tests are conducted until This permit expires, the flow rate to be used in the emission calculations will be the average of the flow rate measured for that stack during the certification test and all flow rate measurements taken for that stack after the certification test. The flow rate used in the emission calculation shall be updated once per year on the anniversary of the original certification tests. If a modification is made that will affect the flow rate, only measurements made after the modification shall be used in the emission calculation.

5 . If any part of the CEMS is not working such that the emissions cannot be calculated as described in 1 through 4 above, the daily VOC emissions will be assumed to be equal to the average actual daily VOC emissions for that day of the week for the previous five weeks.

6. Prior to the installation and certification of the CEMS, the VOC emissions will be calculated by multiplying the number of churn and mogul batches charged by the average emissions per churn and mogul batch, respectively, as determined in part. 7., below.

7. The average emissions per churn and mogul batch will be determined by measuring the change in percent solids of the batch. The starting percent solids of each batch will be calculated based on the actual quantities of each raw material added to each batch. The final percent solids of each batch will be measured at the end of each batch by the Compounding Lead Person. The average solvent loss per batch for all of the churn and mogul batches monitored during this test period will be used to calculate the emissions from the churns and moguls.

The Permittee will collect data from as many batches as possible for a two week period, but in no case will the number of batches from which data is collected be less than 70 percent of the number of all batches charged during the two week period. The two week period shall be begin no later than one week after the issuance of this permit.

Pollutant Control Technique: The 3M flexible permit includes a detailed listing of 93 emission points, associated control equipment and monitoring equipment. That information is listed in section 1.3.1 through 1.3.93 (pages 4 through 40) of the complete permit. Table E includes a list of all required actions and submittals related to control equipment monitoring and testing. Attachment 3 gives a summary of the required “Capture and Destruction Efficiency Testing Plan” for the oxidizers.

TABLE E - REQUIRED ACTIONS AND SUBMITTALS

Action Required	Emission Point No.	Parameter or Pollutant	Compliance Determination Method	Schedule/ Frequency	Special Condition (S.C.) and/or Exhibit
Monitoring	1	Thermal oxidizer minimum temperature	Monitoring	Continuous	S.C. 2.4.2
Thermal oxidizer minimum temperature excursion report	1	Thermal oxidizer minimum temperature	Reporting	Within 14 days of excursion	S.C. 2.4.7
Performance test and calculation	1	Thermal oxidizer retention time	Performance test and calculation	Once no more than 120 days after issuance of this permit and every two years there-after	Attach-ment 3 and Exhibit C
Monitoring	2	5B oxidizer minimum temperatures	Monitoring	Continuous	S.C. 2.4.2
5B oxidizer minimum temperatures excursion report	2	5B oxidizer minimum temperatures	Reporting	Within 14 days of excursion	S.C. 2.4.7
Performance test and calculation	2	5B oxidizer retention time	Performance test and calculation	Once no more than 120 days after initial operation of the modified 5B coater and every two years thereafter	Attach-ment 3 and Exhibit C

Action Required	Emission Point No.	Parameter or Pollutant	Compliance Determination Method	Schedule/ Frequency	Special Condition (S.C.) and/or Exhibit
Performance test	1	Building 23 thermal oxidizer capture efficiency	Performance test	Once no more than 120 days after issuance of this permit and annually thereafter except as allowed by Attachment 3	Attachment 3 and Exhibit C
Performance test	36, 1 part 29	Building 20, 19X area enclosure	Performance test	Once no more than 120 days after issuance of this permit and annually thereafter except as allowed by Attachment 3	Attachment 3 and Exhibit C
Performance test	1	Building 22 thermal oxidizer capture efficiency	Performance test	As requested by Division Manager	Attachment 3 and Exhibit C
Performance test	2	Coater 5B, 5B oxidizer capture efficiency	Performance test	Once no more than 120 days after initial operation of the modified 5B coater and annually thereafter except as allowed by Attachment 3	Attachment 3 and Exhibit C
Performance test	1	Thermal oxidizer destruction efficiency	Performance test	Once no more than 120 days after issuance of this permit and every two years thereafter	Attachment 3 and Exhibit C

Action Required	Emission Point Nos.	Parameter or Pollutant	Compliance Determination Method	Schedule/ Frequency	Special Condition (S.C.) and/or Exhibit
Performance test	2	SB oxidizer destruction efficiency	Performance test	Once no more than 120 days after initial operation of the modified SB coater and every two years thereafter'	Attach-ment 3 and Exhibit C
Performance test	70-73	VOC, NOx, CO, PM	Performance test	Once not more than 180 days after issuance of this permit	Exhibit C and S.C. 2.5.6
Performance test	17	PM and PM-10 and VOC	Performance test	Once not more than 120 days after issuance of this permit	Exhibit C
Performance test	16,19	VOC	Performance test	Once not more than 120 days after issuance of this permit	Exhibit C
Performance test	21	PM and PM-10	Performance test	Once not more than 120 days after issuance of this permit	Exhibit C
Performance test	all	PM, VOC	Performance test	As requested by the Division Manager	Exhibit C
Monitoring	—	Airflow directions	Monitoring	Continuous	S.C. 2.4.5

Action Required	Emission Point Nos.	Parameter or Pollutant	Compliance Determination Method	Schedule/ Frequency	Special Condition (S.C.) and/or Exhibit
Notification of air flow not directed into room	--	Air flow directions	Monitoring	Within 48 hours of discovery	S.C. 2.4.7
Pollution control equipment monitoring devices	1,2,18, 20,22-26,39-41,49, 50,67-69	Downtime Report	Report	Due April 30, July 30, Oct. 30, January 30, each year	S.C. 2.4.7
Monitoring	1	Natural gas usage	Monitoring	Daily	S.C. 2.4.5
Natural gas usage limit exceedance report	1	Natural gas usage	Reporting	Within 14 days of exceedance	S.C. 2.4.7
Emission calculation	1-15,27-33,35,36, 42-48,54, 55,57-61, 62-66	VOC	Emission tracking	Daily	Attach-ment 2 and S.C. 2.4.6
Exceedance of VOC cap	1-15,27-33,35,36, 42-48,54, 55,57-61, 62-66	VOC	Emission tracking and calc-ulations	Within 24 hours of calculating exceedance	S.C. 2.4.7
Total VOC emissions report	1-15,27-33,35,36 42-48,54, 55,57-61, 62-66,74-93	VOC	Emission tracking and calcula-tions	April 30, July 30, October 30, January 30, each year	S.C. 2.4.7
Summary of all physical and oper-ational changes for the calendar year	1-93	all	---	January 31 each year	S.C. 2.4.7

Action Required	Emission Point Nos.	Parameter or Pollutant	Compliance Determination Method	Schedule/ Frequency	Special Condition (S.C.) and/or Exhibit
Certification of fuel sulfur	70-73	% S	vendor certification	Each shipment received	S. C. 2.5.4
Exceedance of % S limit	70-73	% S	vendor certification	Within 14 days of receipt of shipment	S.C. 2.4.7
		other pollutants	Performance	tests	
Installation and certification of CEHS	3-9,14, 15,27-33, 42,54,55	VOC	---	Within 90 days of permit issuance	S.C. 2.4.2.3 and 2.5.5
Notification of CEHS certification tests	3-9,14, 15,27-33, 42,54,55	VOC	---	At least 30 days prior to test	S.C. 2.5.5
CEHS survey	3-9,14, 15,27-33, 42,54,55	VOC	---	Within 60 days of permit issuance or 30 days prior to certification test, whichever is earlier	S.C. 2.5.5
CEHS certification test report submittal	3-9,14, 15,27-33, 42,54,55	VOC	---	Within 30 days of certification test	S.C. 2.5.5
CEHS quarterly report	3-9,14, 15,27-33, 42,54,55	VOC	---	Within 30 days of the end of the monitored quarter	S.C. 2.5.5
CEH plan	3-9,14, 15,27-33, 42,54,55	VOC	---	Within 30 days of permit issuance	Attachment 2
Presurvey Sample Analysis Report	3-9,14, 15,27-33, 42,54,55	VOC	---	March 1, each year	Attachment 2

Action Required	Emission Point Nos.	Parameter or Pollutant	Compliance Determination Method	Schedule/ Frequency	Special Condition (S.C.) and/or Exhibit
Capture efficiency performance tests	1 and 2	Written notice of test date	---	At least 45 days prior to test	Attachment 3 and Exhibit C
Capture efficiency performance tests	1 and 2	Pretest meeting	---	At least 15 days prior to test	Attachment 3 and Exhibit C
Capture efficiency performance tests	1 and 2	Test report	---	No more than 60 days after test and microfiche due no more than 120 days after test	Attachment 3 and Exhibit C
All performance tests other than capture efficiency	1,2,17, 21,70-73	Written notice of test date	---	At least 30 days prior to test date	Exhibit C
All performance tests other than capture efficiency	1,2,17, 21,70-73	Pretest meeting	---	At least 7 working days prior to test date	Exhibit C
All performance tests other than capture efficiency	1,2,17, 21,70-73	Test report	---	Due no more than 45 days after test date and microfiche due within 105 days of test date	Exhibit C

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