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APPENDIX D
MONITORING MATERIAL USAGE

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This appendix presents our recommended approach to monitoring material usage, and to implementing such a monitoring program through the Title V permit. The approach applies to monitoring material usage for purposes of demonstrating compliance with volatile organic compound (VOC) or hazardous air pollutant (HAP) emission limits (including emissions caps). We also recommend this approach for facilities that monitor to demonstrate that they remain below the applicability cutoff for an emission standard or other requirement.

A printing facility may have a variety of compliance options that involve tracking materials. These include options that rely on the average VOC/HAP content of inks and coatings, options that combine lower-VOC/HAP inks and coatings with add-on control, and options that involve tracking recovered solvent for purposes of a liquid-liquid material balance. We recommend this approach for all these situations.

This appendix is divided into three primary sections: (1) general principles, (2) material that should appear in the Title V permit, and (3) material that should reside in a monitoring plan that supplements the permit terms. The second and third sections include some examples of potential content.

In the remainder of this appendix, we use the Printing & Publishing MACT Standard (40 CFR part 63, subpart KK) to illustrate our recommended approach. Specifically, we address a wide-web flexographic press affected source using compliant coating options. However, as noted above, this approach is equally applicable to other situations that involve tracking materials.

Subpart KK requires affected sources to demonstrate compliance for each month. The standard allows wide-web flexographic press affected sources to demonstrate compliance through the use of compliant coatings by any one of six options. These compliance options involve measuring material usage for the month, coupled with data on the composition of the materials. The rule specifies the equations to be used with the usage and composition data for determining compliance status.

Subpart KK clearly specifies the procedures for determining material composition (i.e., HAP, VOC, and solids content) and the equations used to determine compliance status for each month. However, the standard does not specify how the quantity of materials used each month is to be determined. As a result, the facility has the freedom to use reasonable procedures, subject to your approval, as long as compliance with the standard can be reliably determined for each month.

I. GENERAL PRINCIPLES

The following general principles apply to measuring material usage:

1. Current practices for measuring usage are generally acceptable. Subpart KK and Title V presumptively do not require new, more rigorous measurement techniques. Frequent, short-term measurements are not necessarily superior to simpler, broader measurement approaches for purposes of subpart KK. In fact, subpart KK has intentionally been structured to allow such broad measurement approaches.

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2. Measurement procedures are subject to permitting authority approval. You and the facility must come to a common understanding of the specific measurement procedures that a facility intends to use. This understanding may be documented in the permit itself, in the permit application, or in a separate monitoring plan created specifically for this purpose. To maximize compliance flexibility, the facility should include as many subpart KK compliance options and alternative measurement procedures as it reasonably anticipates it may wish to use.
3. The permit must contain a general description of the measurement approach. Title V of the Clean Air Act requires the permit to assure compliance with all applicable requirements. Because measuring the amount of materials used at the facility is crucial to determining compliance for each month, we believe that the permit must describe the measurement procedures to assure compliance with subpart KK. A general description of the data collection approach is sufficient, provided that the permit includes a duty for the facility to prepare and implement a more detailed monitoring plan. (This latter plan, as well as the permit, is subject to your approval.)
4. The specifics of the measurement procedures may reside in a supplemental monitoring plan (either as part of the permit application or as a separate plan). Using a monitoring plan that is not in the permit has a number of advantages. First, the volume of the permit is reduced. Second, revisions can be made to the plan (subject to your approval) without triggering a Title V permit revision, as long the revised plan still conforms to the general description in the permit. Finally, the procedures are clearly laid out, available to you, facility personnel, the public, and us.
5. The margin of compliance is a significant factor in selecting the measurement approach. “Margin of compliance” refers to the difference between a facility’s emissions limit and actual emissions. A large margin of compliance allows a facility to use a less-comprehensive measurement approach, while a narrow margin requires a more comprehensive measurement approach. The measurement approach must be accurate enough for each month’s compliance status to be clearly known. The margin of compliance also bears on the level of quality assurance and quality control (QA/QC) that is necessary. A wide compliance margin may call for less rigorous QA/QC. Tighter QA/QC is appropriate where the compliance margin is slim.

II. PERMIT TERMS AND CONDITIONS

Permits, in general, must include a description of the procedures used to demonstrate compliance. As noted above, this is necessary to meet the Title V requirement that the permit contain terms and conditions to assure compliance. In the case of subpart KK compliance options being discussed here, compliance is demonstrated through monitoring material usage and composition for each month.

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The permit must identify subpart KK as the relevant applicable requirement and include a brief, general description of the overall monitoring approach, including monitoring methods and locations. In addition, the permit should address the “indicator range” for the monitoring system that corresponds to compliance.¹ The permit also should include the data collection frequency, the monitoring averaging period (which is monthly for subpart KK), a general description of the required recordkeeping, and a general description of QA/QC activities associated with the monitoring system. Finally, the permit must include the duty for the facility to prepare a monitoring plan for your approval and to implement the approved procedures in the plan.

An example of the types of information that should appear in the permit is presented below. (This is not intended as actual permit language.) Again, the actual approach placed in the permit will vary and will presumptively follow the historical approach taken by the printer, to the extent that you approve this approach. This example addresses a facility that plans to use a monthly inventory, coupled with purchase records, to determine material usage for each month. We assume that the facility wishes to maintain the option of using any of the six compliant coating compliance options.

Note that this example addresses only subpart KK. Other applicable requirements, such as RACT rules, NSR permit limits, and VOC emissions caps, should be addressed separately, unless these requirements can be streamlined with the subpart KK requirements. Where shorter term limits are applicable and not eligible for streamlining consistent with White Paper Number 2, then presumptively data collection on a project basis will be necessary.

Applicable requirement: 40 CFR part 63, subpart KK limit on organic HAP emissions from product and packaging rotogravure or wide-web flexographic printing presses [§63.825(b)]

General monitoring approach: Collect data for each month on the amount of each material applied on the wide-web flexographic press affected source and on the HAP content of each material. Determine compliance from these data for each month using one of six options in subpart KK.

Monitoring methods and location: Collect data on current inventory of materials in storage at the facility. Collect purchase records for the facility. Collect data on HAP and solids content (such as CPDS from the supplier or test data) for each material. Retain data on HAP and solids content in a permanent file. Determine compliance for each month using any of six compliance options in 40 CFR 63.825(b)(1) through (6). *Note that any equation or replicable procedure relied on to make decisions concerning compliance should be incorporated into the permit.*

¹The term “indicator range” is more appropriately applied to parameter monitoring systems. For the compliant coating alternatives in subpart KK, compliance is determined directly for each month without the use of parameter monitors. In a sense, the compliance indicator ranges for wide-web flexographic presses are from zero up to the alternative limits found in §63.825, such as “HAP emissions between 0 percent and 20 percent of the mass of solids applied for the month.”

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Indicator range: Not applicable; compliance determined directly for each month by one of the six compliant coating compliance options in 40 CFR 63.825(b)(1) through (6).

Data collection frequency: At least monthly.

Averaging period: Monthly for compliance options in 40 CFR 63.825(b)(2) through (5). [The compliant coating compliance options in 40 CFR 63.825(b)(1) and (6) require a compliance determination each month, but do not involve averaging.]

Recordkeeping: All material usage measurements (including inventory data and purchase records), all material composition data (including Method 24/311 data and/or CPDS from suppliers), and documentation of all calculations and results. Record retention and reporting of summary information and deviations are to be performed pursuant to 40 CFR 70.6(a)(3)(ii) and (iii).

QA/QC: Periodic review of data collection, calculation, and recordkeeping procedures. (*Frequency specified as agreed upon by you and the facility.*) Method 24/311 QA/QC procedures if those methods are used (conducted by whomever performs the testing).

Monitoring plan: The facility must prepare a detailed monitoring plan and submit the plan to the permitting authority for approval. The facility must conduct monitoring according to the procedures in the approved plan.

III. CONTENT OF THE MONITORING PLAN

Because subpart KK specifies the procedures for determining material composition and the equations used to determine compliance status for each month, these procedures and equations are not addressed further in the material below. Nevertheless, these procedures and equations should both be incorporated into the permit (where there is a replicable operating procedure) and included in the monitoring plan.

As noted previously, Subpart KK does not specify how the quantity of materials used each month is to be determined. This approach affords the facility the freedom to use any reasonable procedures (with your concurrence), as long as compliance with the standard can be reliably determined for each month. However, in the absence of rule-specified measurement methods, the facility must specify the general monitoring approach in its permit and the detailed monitoring procedures in its monitoring plan.

A full description must be provided for each measurement system used at the facility, along with the type(s) of materials for which the system is used. For example, different measurement systems might be used for inks, coatings, solvents, etc. Alternatively, different systems might be used for materials dispensed from totes, bulk storage tanks, etc.

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Note that this approach presumptively requires documenting the procedures that the facility is already using (or intends to use) and providing an accuracy assessment. No new procedures should normally be needed, with the possible exception of QA/QC procedures where they have not previously been instituted.

To maintain flexibility, a facility may include alternative measurement systems (consistent with subpart KK) in its monitoring plan. For each alternative, the plan should include as much of the detail specified below as possible. If the detail is not known (because the system has been conceived as potentially desirable, but has not been put fully in place), the outlines of the alternative can be included in the plan when subpart KK is initially incorporated into the permit. Subsequently, if the facility wishes to actually implement the alternative, your review of the added detail should be expedited. Because the monitoring plan resides outside the permit, the facility may make changes to the monitoring plan without undertaking a permit revision, provided that the changes remain consistent with the general description of the monitoring program contained in the permit.

The level of detail included in the monitoring plan must be carefully considered by you and the facility. The plan must include enough detail to satisfy you that the data gathered every month will give a true indication of the facility's compliance status for the month. (As the enforcement agency, your primary concern is to be sure that the monitoring program won't incorrectly indicate compliance when the facility actually operated out of compliance.) However, the source should take care not to include unnecessary detail, which could result in an inconsequential change in procedures (without a prior change in the monitoring plan) technically being a deviation from the plan.

The necessary elements for a monitoring plan are laid out below, followed by some examples:

A. Measurement Approach

Subpart KK has been structured to allow for simple inventory measurement approaches, and we expect that these approaches will be used most frequently. Nevertheless, the material below also discusses instrumental and manual approaches that can collect more project specific data over a shorter time period. We have included these measurement approaches primarily to assist facilities that must address other, short-term applicable requirements (e.g., daily, line-by-line VOC compliance). Such facilities also may wish to demonstrate compliance with subpart KK using the measurement approaches that are already in place for purposes of these other applicable requirements. By including this material, the EPA does not intend to suggest that frequent, short-term measurements are required or are superior for purposes of implementing subpart KK.

1. Inventory Approaches (such as tracking usage through drums in storage and deliveries). May be used alone or in combination with instrumental or manual methods.
 - a. Approach used. Describe what is tracked and how the inventory system is used to determine usage over the appropriate period. (E.g., the usage determination is

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based on the unopened drums in storage at the beginning of the month, plus the drums delivered, minus the unopened drums in storage at the end of the month)

- b. Accuracy/scaling. Identify the margin of error inherent in the inventory system. (E.g., for each material where a count of unopened drums in storage is used, indicate the maximum number (n) of partial drums that potentially could go uncounted because they are out on the factory floor. The margin of error = $\pm[n$ multiplied by the capacity of the drums]. This may vary by material due to differences in either (n) or the size of drums that the facility uses for different materials.)
 - c. Location. Describe where the materials are inventoried (e.g., storage areas) or which department maintains the purchase or delivery records used to determine compliance.
2. Instrumental Approaches (such as scales and totalizing volumetric flow meters)
- a. Type of instrument. Identify what is measured and the measurement principle. (E.g., totalizing volumetric flow meter measuring cumulative volume using positive displacement.) For flexibility, the facility can list more than one type of instrument, provided all are acceptable for the purpose.
 - b. Specifications. Identify the minimum accuracy and precision to be achieved by the instrument, with the range within which the specifications are to be achieved. (E.g., scale accurate to within $\pm 1\%$ with precision of $\pm 0.5\%$ between 0 lb and 1000 lb) (Accuracy and precision to be specified only when suppliers of the instrument typically provide these values.) Note that the specifications laid out here do not have to match the specifications provided by the supplier. In fact, it is preferable to allow for reasonable calibration drift, consistent with the accuracy required to determine compliance status reliably. That is, the specifications in the plan can be looser than the specifications provided by the manufacturer (so that the instrument is less likely to deviate from specifications), provided that the specifications in the plan provide are adequate for a clear determination of compliance status.
 - c. Measurement span. Identify the minimum and maximum values that can be measured with the instrument. (E.g., scale with span from 0 to 800 lb) (This criteria is appropriate for instruments where a value is determined along a scale, but may not be appropriate for some instruments, such as a totalizing volumetric flow meter.)
 - d. Scaling. Identify the smallest units that can be read from the instrument. (E.g., totalizing volumetric flow meter with a digital readout to 0.1 gal)

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- e. Location in the process. Identify where in the process the measurement is taken. (E.g., a scale is used to determine the mass of each tote before it is taken to the press and when it is returned)
3. Manual Approaches (such as “sticking” drums and measuring out solvent with a pitcher)
 - a. Approach used. Identify what is measured and how it is measured. (E.g., the depth of material remaining in 55-gal drum is measured by inserting a measuring stick into the drum)
 - b. Specifications. Identify the minimum accuracy of the measuring device (if typically provided by suppliers). (E.g., graduated 2-qt pitcher with markings accurate within ± 2 oz)
 - c. Scaling. Identify the smallest units that can be read from the measuring device. (E.g., measuring stick marked to the $\frac{1}{4}$ in)
 - d. Location in the process. Identify where in the process the measurement is taken. (E.g., thinning solvent is measured out as it is added to each ink/coating)

B. Measurement Frequency

Specify when each measurement is made. Depending on the measurement system, this may be at the beginning and end of each month, the beginning and end of each job, each time solvent is added to an ink or coating, etc.

Note that the compliance options in §§63.825(b)(2) and (3) require tracking of the as-applied composition of each “solids-containing material” (e.g., ink or coating). This requirement means that solvent (or other material) usage must be tracked by the specific solids-containing material to which it is added. A facility that wishes to maintain these options must describe how measurements will be made to allow the as-applied composition of each solids-containing material to be calculated for each month.

C. Calculations

Give the specifics of all calculations used to determine compliance status. The monitoring plan must include the equations provided in subpart KK and any equations used to determine the material usage values that are inserted into subpart KK’s equations. Include sample calculations, including the following types of calculations:

1. Initial Data Entry. If applicable, detail how a measurement of one parameter is converted into other terms at the time of data entry. (For example, the depth of a material remaining in a drum in inches might be converted into the mass of material

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remaining using a formula involving drum volume per inch and the density of the material.)

2. Data Aggregation. If applicable, detail how individual measurements are aggregated prior to final usage calculations.
3. Monthly Usage Calculations. Detail how the value of each symbol related to material usage that appears in subpart KK equations is to be calculated. These details are only needed for those compliance options that the facility wishes to maintain the freedom to use.

D. Recordkeeping

Consistent with subpart KK and the applicable MACT General Provisions on recordkeeping, the facility must maintain records of the data collected and the procedures used to determine compliance with the standard. Thus, for monthly material usage, the facility must record each measurement and document the equations used to determine usage and the results. These records must be retained for 5 years as specified in the MACT General Provisions.

In addition to the recordkeeping requirements above, the permit should specify the following recordkeeping procedures:

1. Responsible Individual. Specify who is responsible for making and recording each measurement. This identification may be by job title, such as “press operator” or “mix room operator.”
2. Data Entry Procedures. Specify when each measurement is to be entered. For example, the readings on a bank of solvent volumetric flow meters may be entered into a log on the first operating day of the month, or the amount of solvent added to a mixing vessel may be entered into a computer at the time the batch is mixed. Each data entry should be initialed by the individual making the entry and accompanied by the date and (if pertinent to compliance) the time of the entry.
3. Data Aggregation Procedures. If applicable, specify any additional steps where data are transferred or aggregated prior to performing calculations. For example, if the material tracking system uses a label affixed to each ink drum in storage on which the current weight of the contents is maintained, the plan might specify that these data are transferred to a log book during the final shift on the last operating day of each month in preparation for a materials inventory at the end of each month. As with initial data entry, any transferred data should be accompanied by the date of the transfer and the initials of the individual making the transfer.

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4. Calculations. Specify who is responsible for making and recording each calculation. Again, this identification may be by job title. Indicate when calculations and results are to be recorded. As above, calculations and results should be accompanied by the date performed and the initials of the individual doing the calculations.

E. Quality Assurance/Quality Control Plan

Any data collection system should have associated QA/QC activities to ensure that the data continue to meet compliance demonstration needs. This section presents the elements that should be addressed in the QA/QC portion of the monitoring plan.

Foremost, the QA/QC plan should make sense for the particular usage measurement systems in use. These plans may be more extensive and detailed for instrumental systems and where many short-term measurements are made. In contrast, a less extensive plan could be needed at a facility that uses a long-term inventory approach that coincides with the materials tracking that the facility conducts for business purposes.

Quality assurance and quality control are concepts that were developed primarily for instrumental measurement systems. Consequently, the elements presented below are, in many cases, applicable primarily to such systems. Many QA/QC plans will not need to address all the elements presented below. See Section III.F below for an example of a QA/QC plan for the long term inventory approaches expected to be used typically for subpart KK compliance demonstrations.

1. Initial Installation and Calibration Procedures. The plan should specify these procedures for instruments and associated automated recording systems. These procedures are expected to be provided by instrument suppliers.
2. Preventive Maintenance (PM) Procedures. The plan should detail regularly-scheduled PM procedures for instruments and automated recording and information storage system. Preventive maintenance for records maintained on computer includes periodic back-up procedures. The PM procedures should include a list of parts kept in inventory.

While not exactly PM, the QA/QC plan also should anticipate routine or otherwise predictable instrument failures. The plan should include procedures for corrective action and a list of parts kept in inventory for this purpose.

3. Frequent QC Checks. The plan should include periodic checks to ensure that the measurement approach is functioning properly. At a minimum, verify that instruments are operating and giving reasonable numbers. Make additional checks as appropriate. (E.g., verify the calibration of a scale using a Class F weight; verify the calibration of liquid flow meters.) The plan should specify what constitutes unacceptable performance and how to identify the beginning and end of any invalid data periods.

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You and the facility should come to agreement on the frequency of these checks. For instruments, the initial frequency should be based on the vendor's recommendations. The plan should provide for increasing the frequency if problems are discovered at the initial frequency. The plan may also allow for the frequency to be decreased if experience shows that less frequent checks are justified.

4. Periodic Data Accuracy Assessments. The QA/QC plan should designate the frequency of these assessments (e.g., semi-annually, annually) and specify what constitutes unacceptable performance. In addition, the plan should specify how to identify beginning and end of any invalid data periods.
 - a. Periodic accuracy audits. The plan should specify procedures for recalibration and determination of calibration error of instruments/automated recording systems, as appropriate. In addition, the plan should provide for assessments of manual measurement devices and replacement, if necessary (markings wearing off, etc.). If an audit determines that the instrument is outside the acceptable range, shorten the period between accuracy audits.
 - b. Independent verification of usage data. Where short-term measurements (e.g., per job) are made and summed for the month, check against long-term inventory records, or vice versa. These comparisons should not be expected to result in exact agreement. However, failure to agree within reasonable expectations can be a signal in short-comings in the tracking system. In accordance with subpart KK reporting requirements, we would expect the facility to conduct this verification semi-annually.
 - c. Periodic reviews. The plan should provide for a periodic review of measurement and recordkeeping procedures to verify that they are being properly followed. During this process, the facility should provide you with an opportunity for on-site evaluation of the usage measurement systems and QA/QC procedures.
 - d. Periodic calculation checks. The plan should provide for periodic verification that the calculations are performed correctly, whether carried out manually or by computer.
5. Data Validity. The QA/QC plan should specify the requirements for usage data to be considered valid. These requirements typically will be based on the parameters that are evaluated for the frequent and periodic checks in III.E.3 and 4 above. Consequently, this element is primarily applicable to instrumental measurement approaches.

The plan may also provide data replacement procedures for invalid data. Replacement data procedures must provide values that are expected never to understate HAP emissions. For example, if a solvent meter malfunctions, the no-data period might be replaced by the highest use rate experienced for that solvent over the last 12 months. A

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missing ink or coating measurement for a job might be replaced by the usage that would occur at the high end of the laydown rate specifications for the job, plus a generous allowance for setup, out-of-spec waste product, and cleaning.

6. Data Availability. The facility must provide a compliance determination (by one of the compliance options) for every month. Failure to provide a determination would be a violation of the rule and the permit.

The QA/QC plan should specify minimum data availability requirements for each measurement needed for the compliance determination. The minimum data availability should be 100 percent minus a specified, reasonable allowance for any downtime associated with QA/QC activities (including responding to the routine instrument failures identified in III.E.2 above, if such failures cannot be reasonably prevented). Failure to achieve this minimum would be a violation of the permit, as well. Note, however, that for those measurements for which acceptable data replacement procedures have been established (as discussed above in III.E.5), replacement data may be used to achieve the required minimum.

Despite the preceding paragraph, the source is not liable for failing to meet the data availability requirements as a result of a sudden and unforeseeable event beyond the source's control. Failures caused in whole or in part by poor maintenance, careless operation, or other preventable conditions are not considered to be "beyond the source's control."

7. Recordkeeping. The QA/QC plan should specify recordkeeping procedures to document that the QA/QC program has been carried out properly. The facility should retain records of the results of QA/QC activities (e.g., checklists and forms on which to record routine actions and outcomes) as required for other compliance activity records.
8. Miscellaneous. The following miscellaneous materials should be included in the QA/QC plan:
 - a. QA/QC responsibilities (which departments, groups, or individuals are responsible for each aspect of the plan).
 - b. Schedules for frequent checks, periodic audits/reviews, and PM activities.
 - c. Checklists, data sheets, PM procedures specified by instrument manufacturers, and the spare parts inventory.
 - d. Description of medium, format, and location of all records and of the reports that the facility must submit to you.

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9. Annual Review. At least annually, review the monitoring program and results and the workings of the entire QA/QC plan. Revise the QA/QC plan, if necessary.

F. Example Monitoring Plan

Below is an example of a very simple inventory system suitable for a facility with a wide margin of compliance, that is, a facility with HAP emissions well below the subpart KK limits. As mentioned earlier, the margin of compliance is a significant factor in selecting the measurement approach. A large margin of compliance allows a facility to use a less comprehensive measurement approach and less rigorous QA/QC, while a narrow margin requires a more comprehensive measurement approach and tighter, or more rigorous, QA/QC. In any event, the measurement approach must be accurate enough for each month's compliance status to be clearly known.

Example for a Facility with a Wide Margin of Compliance. Some wide-web flexographic press facilities expect to achieve a very wide margin of compliance. These facilities may use hundreds of thousands of pounds of materials with little or no HAP content each month, and only hundreds of pounds (or less) of materials with HAP contents above the subpart KK limits.

Such facilities can easily demonstrate compliance using the options in 40 CFR 63.825(b)(4) or (5) (monthly average as-applied organic HAP content) and a very simple inventory system based on purchase records alone. This system is generally applicable to facilities whose regulated emissions are at a level of 50 percent or less of the standard. However, the appropriateness of the system depends on the facility's particular ratio of compliant to noncompliant materials, HAP content of each type of material, and pattern and size of deliveries.

Note that this measurement system may also be appropriate for facilities tracking a rolling 12-month total VOC emissions cap established as part of the permitting process, particularly after 12 months of data have been accumulated. Again, the suitability depends on the particular situation at a facility.

- a. Measurement approach. WWFCo operates several wide-web flexographic presses and is subject to 40 CFR part 63, subpart KK. WWFCo will demonstrate compliance with subpart KK for each month using the procedures of 40 CFR 63.825(b)(4) or (5).

HAP content (C_{hi} and C_{hj}) and solids content (C_{si}) of materials applied:

WWFCo will use the values from the most recent certified product data sheet (CPDS) obtained from each material's supplier, unless the permitting authority calls for testing pursuant to Method 24 or 301. The data sheets are kept on file in the facility's Environment, Health, and Safety Department (EHSD) offices.

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Quantity of materials applied for the month (M_i and M_j): WWFCo will approximate the quantity of each material used for the month by summing the amount of the material purchased during the month, based on purchase records. The purchase records are maintained in the facility's Purchasing Department (PD) computing system. All purchases are transacted in terms of pounds delivered.

This method implicitly assumes that all purchased materials are applied during the month, and that no other materials (i.e., materials on hand at the beginning of the month) are applied. This approach leads to a potential error for each material of up to plus or minus the amount of a single purchase. For our highest use material, which is delivered weekly by tanker truck and held in a bulk storage tank, the potential error is $\pm 20,000$ lb, which represents 25 percent of typical monthly usage. All high-usage materials are very low (or zero) HAP. (We use approximately 200,000 lb/month of such materials.) For our lowest usage materials, the potential error is ± 200 lb, which is approximately 400 percent of typical monthly usage. Our few noncompliant materials (typically totaling less than 200 lb/month) are in this range. We are confident that with our large margin of compliance, these measurement errors will not result in either a false determination of compliance or a false determination of noncompliance.

b. Measurement frequency.

Material composition: WWFCo's suppliers provide a CPDS each time we purchase a new product or the supplier changes the formulation of the material. New CPDSs replace any outdated versions immediately upon receipt.

Material usage: Each purchase record is a "measurement." Purchase records are entered into our system within 1 working day after the delivery.

c. Calculations.

Material composition: None. Values supplied on CPDSs.

Material usage: For each material, all purchases during the month are summed to approximate total usage for the month. Purchases are all conducted in terms of pounds of material, so no conversions are required. For example, if three shipments of Material A are received during a month, the calculation might look like:

$$\begin{aligned} \text{Material A} &= \text{Shipment 1} + \text{Shipment 2} + \text{Shipment 3} \\ &= 2,410 \text{ lb} + 2,116 \text{ lb} + 1,966 \text{ lb} \\ &= 6,492 \text{ lb} \end{aligned}$$

Monthly compliance: WWFCo will use Equation 6 or 7 from subpart KK.

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- d. Recordkeeping. WWFCo will maintain hard copies of each current CPDS in the EHSD files. New and replacement CPDS are transmitted to WWFCo by the supplier upon delivery and routed to a WWFCo environmental engineer. The engineer enters each pertinent CPDS value into our material compliance spreadsheet prior to performing the compliance calculations at the end of the month. The CPDSs are filed by the EHSD clerical staff after being entered into the compliance spreadsheet.

Purchase records are created at the time of material delivery. These records typically are entered into the PD computer within 1 working day after the delivery.

After the last day of each month, a WWFCo environmental engineer downloads all material purchase records from the PD computer and uploads the records into the material compliance spreadsheet. Using a macro, the spreadsheet automatically sums the various materials by material ID number and performs the compliance calculation using both Equations 6 and 7 from subpart KK. The engineer verifies that the results demonstrate compliance for the month. Each monthly spreadsheet is saved, including the engineer's name and the date and time. The saved spreadsheets are included in the computer file backup that is conducted every Friday evening.

For semi-annual reports, a macro extracts the data for each month and prepares appropriate tables. A WWFCo environmental engineer prepares the appropriate text for the report, and a responsible official signs and submits the report. The reports are maintained as electronic computer files on the EHSD computer system and in hard copy in EHSD files.

- e. QA/QC plan. All computer data and records in the EHSD and PD are backed up every Friday evening.

Every 6 months, EHSD staff will perform a review of the EHSD purchase records (i.e., the records uploaded into the compliance spreadsheet) against summary records received from the material suppliers. If these records fail to agree within 10 percent, EHSD staff will evaluate the probable sources of error and, if necessary, revise the monitoring plan to correct any shortcomings.

Every year, WWFCo will perform a comprehensive review of the monitoring program. The review will examine whether all responsible personnel are carrying out their duties properly and whether all systems are working properly to yield a definitive and accurate assessment of monthly compliance status. As part of this review, EHSD staff will spot-check the material composition values in the spreadsheet against CPDS hard copies. EHSD staff will review all spreadsheet macros and equations to verify that they are correct. For any errors that are identified, the past year's compliance calculations will be redone, and the results reported to the permitting authority. The corrected calculations will replace the erroneous ones. If any errors are identified, the QA/QC plan will be revised to minimize their reoccurrence.

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Records of all QA/QC activities, audits, and reviews will be maintained in QA/QC files in EHSD.