AP42 Section:	10.5
Reference:	4
Title:	Written communication from John Pinkerton, National Council of the Paper Industry for Air and Stream Improvement, Inc., to Dallas Safriet, U. S. Environmental Protection Agency, Research Triangle Park, NC, April 13, 1993. 2002 supplement

(14)

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April 13, 1993

Mr. Dallas W. Safriet (MD-14)
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Dear Dallas:

RE: Draft Revision of AP-42 Section 10.5, "Plywood Manufacturing"

We appreciate the opportunity to review the subject draft section of AP-42 as requested in your February 2 letter, and apologize for the delay in forwarding this response.

In general, we feel the revised material prepared by EPA and its contractor represent a major improvement over the current AP-42 section on plywood manufacturing. The distinction between condensible and non-condensible VOCs and between filterable and condensible particulates is very useful. Discussion of the various measurement methods and the effects of filter temperature in the documentation section is helpful.

However, a careful review of the documentation section has revealed several apparent shortcomings in the interpretation, analysis and use of available emission measurements. The majority of measurement data was obtained from NCASI Technical Bulletin No. 405, "A Study of Organic Compound Emissions from Veneer Dryers and Means for their Control" (later referred to as TB 405). In our opinion, this document provides a comprehensive compilation of emission measurements from softwood veneer dryers and could be used by itself as a primary source for emission factors. We feel the authors of the AP-42 documentation section have inappropriately reinterpreted much the information contained in TB 405.

National Council staff who reviewed the draft AP-42 material included David Rovell-Rixx, David Word, Andre Caron and myself. We have also spoken with Victor Dallons, a former NCASI employee who was the primary investigator and author of TB 405, and some of his review comments are incorporated in this letter. Our comments focus mainly on the documentation section which forms

the basis for the revised draft Section 10.5. We have also provided you with a few comments on the draft AP-42 section. Our comments are provided by page number.

Documentation Section

10.5-2. The correct SIC code for hardwood plywood is 2435.

10.5-2. It would seem production figures for a more recent year than 1987 would be available to include in Section 2.1.

10.5-9. Press temperatures generally range from 270 to 330°F for softwood plywood, and 225 to 275°F for hardwood plywood.

10.5-10. Unless a veneer dryer is directly-fired with wood fuels, particulate emissions from dryers would all be expected to be classified as PM_{10}.

10.5-10. Emissions of hazardous air pollutants from veneer drying are unlikely (see "Study of the Physical and Chemical Properties of Atmospheric Aerosols Attributable to Plywood Dryer Emissions", Final Report to the American Plywood Association by D. Cronn, M. Campbell, L. Bamesburger, and S. Truitt, 1981). However, trace amounts of combustion by-products which are considered to be hazardous air pollutants, e.g. aldehydes, may be present in direct-fired veneer dryer exhausts as a result of fossil fuel or wood combustion gases being passed through the dryer.

10.5-10. Condensible compounds in veneer dryer emissions which are associated with 'blue haze' are primarily resin and fatty acids, which condense at much higher temperatures than 70°F. These compounds do not have be cooled to below 70°F or combine with water vapor to become visible. We are not aware of any evidence that wood sugars are a component of condensible organics. VOCs resulting from combustion are only found in direct-fired veneer dryer exhausts.

10.5-10. We are not aware of any measurement data which would suggest the type of resin applied would have an effect on the quantity or composition of compounds present in press vent exhaust gases. This inference should be deleted unless a reference can be provided.

10.5-10. Trimming and sanding operations are normally controlled to prevent fugitive particulate emissions and to recover the material for use as a fuel.

10.5-11. An EFB will not control condensible organic emissions unless the dryer exhaust is cooled sufficiently to cause

condensation of certain organics prior to the EFB.

10.5-11. The authors should check to ascertain if any plywood plants are still directing dryer exhaust to boilers. Most plants have discontinued this practice. Furthermore, plants which did combust veneer dryer exhaust had boilers which were larger than required to produce steam and hot water for the plywood operation.

10.5-11. To our knowledge, there have been no recent installations of ionizing wet scrubbers on veneer dryers, and it should not be identified as an "emerging technology".

10.5-11. EFBs used on veneer dryers typically have a fixed, rather than a moving, gravel bed.

10.5-12. Baghouses are also commonly used to control particulate emissions from sanding, trimming, and material handling operations.

10.5-12. A possible addition to the list of references is "Control Techniques for Organic Emissions from Plywood Veneer Dryers" (EPA-450/3-83-012), May 1983.
PB 83-228247

10.5-14. A more recent Census of Manufacturers should be used since there have been numerous plant closures since 1987.

10.5-14. NCASI is not a trade association; it is the environmental technical studies organization of the forest products industry.

10.5-19. It is our understanding that EPA Method 18 is not appropriate for measurement of formaldehyde. EPA's favored measurement method is currently draft Method 0011, which is being widely used by EPA contractors at the present time. We feel any formaldehyde measurements made with Method 18 or some variant of Method 18 are highly questionable, especially if the method has not been subject to a Method 301 validation for this type of source.

10.5-19. It is not clear if the hood capture efficiency for the press vent area was determined. If the efficiency is less than 100%, VOC and formaldehyde emission rates measured at the hood exit may understate these rates.

10.5-20. Data from references 3 and 5 were cited in TB 405 as mills C and E, respectively. Unfortunately, the same data from these two plants have been counted twice in many of the emission factor calculations. These computations need to be corrected.

10.5-24. As noted earlier, Mill C test results are the same as described in Reference 3.

10.5-25. As noted earlier, Mill E test results are the same as described in Reference 5.

10.5-33. Although the authors have chosen to express VOC emissions in terms of methane, it should be acknowledged that expressing VOC results in terms of carbon is currently the most widely accepted reporting method. We would encourage EPA to review all sampling data cited in the report to ensure that all VOC results expressed as carbon or propane have been properly converted to methane equivalents. Furthermore, the text should provide the appropriate conversion factors.

10.5-35, 36 (Table 4-3). In this table and all other tables with emission factors, we would strongly suggest that only English units be shown. All referenced data are expressed in English units, and metric units are rarely used in the U.S. plywood industry. Eliminating the metric units would make the tables more user-friendly and would avoid the possibility of errors in converting the English units to metric units.

10.5-35, 36 (Table 4-3). All entries in this table are from TB 405. The first four entries were taken from Appendix C for Mill I, the next eight entries were for Mill J, and the next three for Mill K. The remaining entries were taken from Tables 9 and 10. As stated in TB 405, the data contained in Tables 9 and 10 includes sampling results from the various mills described in Appendix C. Thus many of the entries in Table 4-3 are for the same data points. For example, the Appendix C VOC data for Mill K are shown in line 13 of Table 4-3 (two test runs, results of 2.4 and 3.9 lb/MSF). Then the Mill K individual VOC test run results taken from Table 9 are shown again in lines 16 and 17. This table should be reviewed and duplicate sampling results removed.

10.5-35, 36 (Table 4-3). In extracting test information from TB 405, it appears that many factors discussed in the report were either overlooked or ignored. For example, the Mill J and K veneer dryers recirculated a portion of the dryer exhaust to a blend box, with the remainder of the exhaust being ducted to the atmosphere. Exhaust gas recirculation may affect the characteristics of VOCs and particulates in the dryer exhaust, yet there is no discussion of this possibility in the text accompanying Table 4-3. Measurements taken before and after blend boxes have been averaged in many cases; such averaging may not be appropriate. A second example is the omission of the distinction between sampling results for Douglas fir heartwood versus sapwood. The heartwood VOC results were 50% lower than the sapwood results, yet the two have been averaged together in

line 13 of the table. As a third example, CO measurements at Mill J were made both before and after the ionizing wet scrubber. In Table 4-3, the CO data from Mill J have been subdivided according to the species being dried during the test run. In line 11, two outlet test runs and one inlet test run (taken simultaneously with the second outlet test run) have been averaged. In line 12, an inlet and outlet test run taken at the same time have been averaged together. Since CO emissions are primarily from the fuel cell, and would not be expected to change across a wet scrubber, we question the appropriateness of subdividing CO test results by wood species, especially considering that the exhausts gases were from three dryer lines, only one of which dried white fir during the first three test runs. In addition, we were not able to calculate the same lb/MSF values shown in Table 4-3 from the reported Appendix C CO concentration data for Mill J; we suggest that these calculations be checked to verify their accuracy.

10.5-37 to 42 (Table 4-4). Similar to Table 4-3, this table contains many duplicate entries from TB 405. In addition, there are duplicate entries from TB 405 and References 3 and 5 as noted earlier. As for Table 4-3, we suggest that EPA review the organization of data presented in this table to ensure test results have been put in appropriate categories.

10.5-38, 39. The last line in Table 4-4 on page 10.5-38 and the first line on page 10.5-38 are apparent misinterpretations of Mill F sampling results from TB 405. The veneer dryer at this plant had two exhaust stacks, one at the green end and one at the dry end. The stacks were sampled in sequence, and the results should be added together, not counted as separate runs. This error needs to be corrected in subsequent tables as well.

10.5-39. The third and fourth lines of Table 4-4 on this page cite ODEQ-7 results for Mill G, as described in Appendix C of TB 405. These test data were taken on the green end stack of a southern pine veneer dryer. As described in TB 405, this dryer had three additional stacks at the dry end which were not sampled with ODEQ-7. Thus the PM and condesible emission rates cited in Table 4-4 only represent part of the total emissions for this dryer. The results should be removed from the table and all subsequent calculations.

10.5-42. The emission factors presented in Reference 8 have a calculation error, as discussed in TB 405. Corrected values may also be found in Table 7 of TB 405. According to Victor Dallons, the values from Reference 8 should be multiplied by 6 to correct for the 6 carbon atoms used in the calibration gas.

10.5-43, 44 (Table 4-5). All data in this table were taken from Table 11 in TB 405. Unfortunately, emissions for direct wood-

fired dryers appearing in the last portion of Table 11 were inadvertently mislabeled as 'Direct-Fired Gas Fired'. Thus test results beginning at line 15 of Table 4-5 should be deleted from this table and moved into Table 4-3.

10.5-46. As discussed earlier, we have reservations about the averaging procedure used to calculate the CO emission factor. The discussion should include information about the dryer exhaust recycling to a blend box and its potential effect on CO concentrations in the dryer exhaust.

10.5-47, 48 (Tables 4-7 and 4-8). The ND entries under SO_2 should be changed to NA; combustion of natural gas, propane or wood fuels results in negligible SO_2 emissions.

10.5-49 to 52 (Tables 4-9 and 4-10). References to sizer cyclones and EPA Methods 201/201A in Footnote b should be deleted since none of the measurements used for developing these tables were made with these measurement techniques. Reference to EPA Method 202 in Footnote c should be deleted for the same reason. A footnote should be added to the column labeled "PM (filterable and condensible)" to indicate these measurements represent ODEQ-7 results. It would also be helpful to note the effect different filter temperatures have on the filterable and condensible emissions. In fact, some of the PM factors have been computed using ODEQ-7 results with varying front-half filter temperatures. For example, the factor for steam-heated units drying firs and hemlock, after a wet scrubber, was calculated from ODEQ-7 runs which had filter temperatures of 190 and 250°F. The factor for steam-heated units redrying veneer, after a scrubber, is based ODEQ-7 results with a filter temperature of 154°F.

10.5-49 to 52 (Tables 4-9 and 4-10). We would urge EPA to review the data averaging procedures employed in calculating the emission factors shown in this table from the disaggregated data presented in Tables 4-3, 4-4 and 4-5. The emission factors for gas-fired dryers need to be recalculated as indicated earlier. The PM entry under steam-heated veneer dryers for pines should be labeled as after a wet scrubber in the first column since the value represents the average of three ODEQ-7 runs at Mill A after the Burley scrubber, as reported in TB 405. The entries for steam-heated dryers for pines demonstrates the inappropriateness of using different data sources for the filterable, condensible and total PM emission factors. A casual reader would wonder how the total PM after a control device could be almost twice as large as the sum of the filterable plus condensible uncontrolled components of total PM. As noted earlier, there are calculation errors in the filterable and condensible emission factors for steam-heated units drying pines.

10.5-53 (Table 4-11). Again we would urge EPA to review the selection and averaging procedures used to calculate the various emission factors included in this table. For example, the wood-fired dryer VOC factor of 2 lb/MSF is obtained from averaging two emission factors, one for hemlock (0.77) and one for Douglas fir (3.15). Four sampling runs at one dryer were used to obtain the hemlock value. However, the Douglas fir value was the average of one run on heartwood (2.4) and one run on sapwood (3.9). It simply does not seem reasonable to combine these diverse results into a single emission factor for 'fir and hemlock'. The wood-fired dryer NC-VOC emission factor of 1 lb/MSF was obtained by averaging emission factors for five different species or species mixes given in Table 4-3. Another way of calculating this factor would be to average the emission factors for each of the three dryers (Mills I, J and K in TB 405); the resulting factor would be 1.3 lb/MSF. A third alternative would be to assign equal weight to each individual sampling run (total of 11); the resulting factor would be 1.1 lb/MSF. There are still other variations possible with these data points since four of the Mill J test runs represented simultaneous scrubber inlet/outlet values, and it could be argued that these should be considered as two data points, not four. The point to be made is that there are many different ways to calculate emission factors, and we feel EPA has not always chosen the most reasonable method for the calculations. Calculations for all of the factors in Table 4-11 should be reviewed carefully to ensure they make sense. Again, presentation of single number in the table fails to indicate the wide range in observed test results and the number of sources and test runs used to compute the factor. This information should be included to assist the AP-42 user.

10.5-53 (Table 4-11). The calculation of the VOC emission factors for a steam-heated unit drying firs and hemlock (with and without controls) should be redone to eliminate double-counting of Mill C test results. It is questionable as to whether emissions from two quite different scrubbing systems (sprays followed by a packed tower versus the Burley system) should be averaged together, especially considering there was roughly a factor of two difference in the VOC emission rates. An explanatory footnote about the possibility of a VOC contribution from the scrubber water should be added to the redry emission factor.

10.5-53 (Table 4-11). The average for steam-heated dryers for VOC for pines should be 2.9 rather than 2.7 lb/MSF. A footnote should be added to explain that THC refers to an EPA Method 25A measurement. The potential effect of varying Method 25 filter temperatures should be addressed considering that factors for pine of 2.14 lb/MSF, redry of 0.03 lb/MSF and redry with wet scrubber of 0.3 lb/MSF were developed from one, one and two sample runs, respectively, with filter temperatures of 150°F.

10.5-53 (Table 4-11). The wisdom of including formaldehyde measurements made with an unproven, unvalidated sampling method at a single source should be seriously reconsidered.

Draft AP-42 Section 10.5, Pages 10.5-1 to 10.5-12

General

This section should be consistent with the documentation report. It will need to be revised to reflect changes which will be made to the draft documentation report.

As with other AP-42 sections, the National Council staff continue to object to the presentation of single numbers in tables. A single average number does not provide the AP-42 user with an appreciation of the variability which may exist among similar sources. Since ranges are already included in the documentation section, we see no reason why ranges should be excluded from the AP-42 section. We also feel it is a disservice to AP-42 users to not indicate the number of sources or test runs which were used to develop the emission factors. Without this information, users have no idea about the robustness of a given factor and the degree of confidence that should be assigned to it. Assignment of subjective data quality ratings is a poor substitute for showing ranges and number of sources or test runs.

Specific

10.5-9 (Table 10.5-5). The terms VOC, NC-VOC and THC should be defined in a footnote, including mention of the sampling method and associated filter temperatures. The filter temperatures should be noted to avoid confusion because EPA Method 25 was revised in 1988 to specify a filter held at 250°F (all data included in the emission factors are pre-1988). It should also be clearly indicated that the emission factors are expressed as methane.

10.5-12. Reference 12 and 14 are the same document.

The NCASI staff appreciates the opportunity to provide comments on this proposed revision to AP-42 and hope that our comments will result in an improved quality document. We would be pleased to further discuss these comments with you or your consultants and answer any questions you may have concerning the above material. We would like to review the revised draft when it becomes available.

Furthermore, the NCASI staff would welcome the chance to review proposed revisions to other AP-42 sections dealing with other forest products industry sources such as combination boilers, wood pulping operations, particleboard plants, OSB plants, MDF plants, hardboard plants, and sawmills, as well as prescribed forestry burning activities.

Very truly yours,

John E. Pinkerton

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