ncasi technical bulletin

NATIONAL COUNCIL OF THE PAPER INDUSTRY FOR AIR AND STREAM IMPROVEMENT, INC.
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COMPILATION OF 'AIR TOXIC' AND TOTAL HYDROCARBON EMISSIONS DATA FOR SOURCES AT CHEMICAL WOOD PULP MILLS

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COMPILATION OF 'AIR TOXIC' AND TOTAL HYDROCARBON EMISSIONS DATA FOR SOURCES AT CHEMICAL WOOD PULP MILLS

As a result of the Clean Air Act Amendments, most pulp and paper mills are in the process of preparing applications for state operating permits. Also, EPA is developing control technology-based emission standards for 189 hazardous air pollutants (HAPs) that may be emitted by various industrial sources. NCASI Technical Bulletin No. 650 summarized available test data for HAPs and other so-called 'air toxics' as of June 1993. Since then, the industry has conducted an extensive 16-mill measurement program for 'air toxic' emissions from sources located at chemical wood pulp and paper mills, with results summarized in a series of ten reports (NCASI Technical Bulletin Nos. 675 - 684). Ten other mills were extensively tested by one company, and results from several other company-sponsored tests were recently made available to NCASI.

This report is an update to NCASI Technical Bulletin No. 650. It incorporates all of the new data that became available since the first compilation, and preserves most of the old data. Besides the eight mills tested during the pooled testing programs in California and Texas, mill-wide test data from 26 additional chemical wood pulp mills are included in this report. The sources covered include (1) pulp mill sources such as oxygen delignification systems, brownstock washers, deckers, thermal oxidizers, pulp and liquor storage tanks, (2) recovery area sources such as kraft and sulfite recovery furnaces, lime kilns, smelt dissolving tanks, black liquor oxidation tanks, tall oil reactors and causticizing area vents, (3) bleach plants, (4) paper machines, and (5) wood residue-fired boilers. In addition to organic 'air toxics,' information was available for certain TRS compounds (such as H2S, CS_2, COS), inorganic gaseous 'air toxics' (such as HCL, H_2SO_4, NH_3, Cl_2, ClO_2) and trace metals. Unlike in the previous compilation, a median was chosen to best represent average emissions throughout this report. When more than 50 percent of the data for a given compound and source were above the detection limit, a straight empirical median was used When fewer than 50 percent of the data were above the detection limit, different statistical procedures were used. Either the NOR-PLOT median or the SDln median were used, depending on the extent of data below the detection limit.

This report comprises the most extensive compilation of 'air toxic' emission data relevant to the chemical wood pulping segment of our industry. The compilation is intended to assist mills in preparing applications for air quality construction and operating permits. Since data were obtained

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from a variety of mills, the medians presented in the report should not be taken to represent emissions from a particular mill. For many unit process operations, the number of sources tested was limited, and these data should be used with utmost caution. The precautioning notes in the report tables should be heeded to avoid inappropriate use or unwarranted extrapolation of the available data. NCASI staff should be consulted if questions arise.

This report was prepared by Drs. Arun Someshwar, Senior Research Engineer, and David S. Dillard, Research Engineer, at the Southern Regional Center. Dr. Steven Hinton, former Research Engineer at the Northeast Regional Center, assisted in the application of statistical techniques to derive medians of heavily censored data. Questions and comments on the material contained in this report are solicited, and should be directed to Dr. Someshwar or Dr. Dillard at NCASI, P.O. Box 141020, Gainesville, FL 32614-1020, telephone (904) 377-4708, ext. 226 or 253; or to Dr. John Pinkerton at this office.

Very truly yours,

Ronald A. Yeske, Ph.D.

Attachment

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ABSTRACT: Emissions data, including those from recent testing programs at chemical wood pulp and paper mills, have been compiled for numerous volatile organic compounds, trace metals and a few inorganic 'air toxics.' Data on total hydrocarbons and selected data on CO emissions from bleach plant vents and one oxygen delignification system vent are also included. The majority of these data are from two recent studies (1993, 1994) covering 26 mills. When a significant portion of the measurements for a given source and compound were below method detection limits, the data were statistically treated before computing median emission rates. Data were tabulated for pulping area sources (oxygen delignification systems, brownstock washers, deckers, thermal oxidizers, uncontrolled NCGs and black liquor and pulp storage tanks), recovery area sources (kraft and sulfite recovery furnaces, lime kilns, smelt dissolving tanks, black liquor oxidation tanks, tall oil reactors and causticizing area vents), bleach plants, paper machines and wood-fired boilers. Correlations for predicting methanol emissions from process data are included for four processes (brownstock washers, oxygen delignification systems, smelt dissolving tanks and paper machines).

KEY WORDS: kraft recovery furnace, sulfite recovery furnace, black liquor oxidation, smelt dissolving tank, lime kiln, oxygen delignification, bleach plant, tall oil reactor, causticizer/slaker, thermal oxidizer, brownstock washer, black liquor storage tank, pulp storage tank, deckers, uncontrolled NCG vents, 'air toxics,' HAPs, trace metal, volatile organic compounds

RELATED NCASI PUBLICATIONS:

(1) "Compilation of 'Air Toxic' Emission Data for Boilers, Pulp Mills and Bleach Plants," NCASI Technical Bulletin No. 650 (June 1993).

(2) "Volatile Organic Emissions from Pulp and Paper Mill Sources - Parts I through X," NCASI Technical Bulletins Nos. 675-684 (August-December 1994).

COMPILATION OF 'AIR TOXIC' AND TOTAL HYDROCARBON EMISSIONS DATA FOR SOURCES AT CHEMICAL WOOD PULP MILLS

I INTRODUCTION

As a result of the 1990 Clean Air Act Amendments, most pulp and paper mills will be required to prepare applications for state operating permits. To assist mills in estimating emissions of three criteria pollutants, viz., oxides of nitrogen, sulfur dioxide and volatile organic compounds (VOCs), NCASI published Technical Bulletin No. 646, "Emission Factors for NO_x, SO_2 and VOCs for Boilers, Kraft Pulp Mills and Bleach Plants" (1). Subsequent to Technical Bulletin No. 646, NCASI published Technical Bulletin No. 650, "Compilation of 'Air Toxic' Emission Data for Boilers, Pulp Mills and Bleach Plants" (2).

Since publication of these reports in 1993, the industry has completed an extensive measurement program for 'air toxic' emissions from sources located at chemical wood pulp and paper mills. The program was carried out by NCASI to provide the industry and EPA with relevant information for the development of Maximum Achievable Control Technology (MACT) emission standards for chemical wood pulp mills. In addition to this 16 mill study, individual companies have conducted 'air toxic' measurements at several chemical pulp and paper mills. Altogether, a total of 26 chemical wood pulp mills have been extensively tested for 'air toxic' emissions from pulp mill, bleach plant, chemical recovery and paper mill sources. This report represents an update of Technical Bulletin No. 650 with the addition of data gathered at the 26 mills. In addition to organic and inorganic 'air toxic' emissions, this report also presents the most current update on emissions of VOCs from several chemical wood pulp mill sources.

This data summary should be useful to chemical wood pulp mills preparing construction or operating permit applications where estimates of 'air toxic' and total VOC emissions are required.

II SOURCES OF DATA

Several major studies provide the majority of measurement data compiled in this report. Table 1 provides a complete list of sources for which data on 'air toxic' emissions, both gaseous and trace metals, and emissions of total hydrocarbons are included in this bulletin. Four types of sources located at chemical pulp mills are covered in this report; bleach plants, pulp mills, chemical recovery areas and paper machines. Also, emissions data for wood residue/bark boilers that were presented in NCASI Technical Bulletin No. 650 (2) are fully reproduced here using a different approach to determination of emission averages. This approach is explained later in Section III.

A. Bleach Plants

Sources of data on organic 'air toxic' emissions and emissions of total hydrocarbons (THCs), terpenes, Cl_2, ClO_2, HCl and carbon monoxide from bleach plants are the Texas Air Control Board (TACB) Study (3), the Humboldt Bay Kraft Pulp Mill Study (4), the 1990 California Air Resources Board (CARB) Study (5), two EPA studies (6,7), some early NCASI measurements (8), some more recent (1993) NCASI mill studies (9) and the NCASI 16 mill MACT study (16). The data compiled in this report for bleach plants are from a total of 52 sources located at kraft, soda and sulfite pulp mills.

B. Pulp Mill Sources

'Air toxic' and THC emission data for pulp mill sources were mainly compiled from five major studies. The TACB study (3) included four brownstock washing lines. The August 1992 EPA-sponsored mill study (7) included an O_2 delignification system. NCASI testing for methanol, acetone and MEK between 1990 and 1992 (8) included three O_2 delignification systems and two brownstock washers. Considerable amounts of test data for pulp mill sources included in this compilation were obtained from tests conducted by individual mills; detailed sampling reports are available in NCASI files (9). In fact, a ten mill study was conducted in 1993 by one company. The majority of pulp mill emissions data in this report, however, came from the 1993-1994 NCASI 16 mill MACT study (12,14,15,19). Emission data for O_2 delignification systems, brownstock washers, deckers, uncontrolled kraft noncondensible gas (NCG) vents, NCG thermal oxidizers, black liquor tanks, unbleached pulp storage tanks and sulfite pulping sources are contained in this report.

C. Chemical Recovery Area Sources

'Air toxic' and THC emission data for chemical recovery area sources were compiled from six major studies. Selective data on HCl, H_2SO_4 and polyaromatic hydrocarbon (PAH) emissions from kraft recovery furnaces, HCl from sulfite recovery furnaces, PAHs from lime kilns, and ammonia from smelt dissolving tank and causticizing area sources are also included. The TACB study (3) included emissions from DCE and NDCE kraft recovery furnaces, lime kilns, smelt dissolving tanks and tall oil reactors. The 1988 Humboldt Bay Kraft Pulp Mill Study (4) included emissions from two DCE kraft recovery furnaces. The 1990 CARB study (5) included emissions from an NDCE kraft recovery furnace, a lime kiln and a smelt dissolving tank vent. NCASI testing for methanol, acetone and MEK during 1990 to 1992 (8) included emissions from several kraft recovery furnaces. A considerable amount of recent test data (1993) included in this report is from individual mill-conducted tests. Detailed reports are available in NCASI files (9). These mill-conducted tests included emissions from more than 12 different pulp mills for DCE and NDCE kraft recovery furnaces, sulfite recovery furnaces, lime kilns, smelt dissolving tanks, tall oil reactors, causticizers and slakers. This report also contains the 'air toxic' emission data obtained during the 16 mill NCASI MACT study for recovery furnaces, lime kilns, smelt dissolving tanks, tall oil reactors, causticizers and slakers (13,14,17,19).

D. Paper Machines

The 'air toxic' and THC emission data for paper machines in this report were compiled exclusively from the NCASI MACT study (18). 'Air toxic' emissions were measured at five chemical wood pulp mills. Sources tested were one bleached pulp dryer, two unbleached linerboard machines, one bleached coated paper machine and one semi-chemical corrugating medium machine. It should be noted that these paper machines all used wood pulp produced on-site as the main furnish.

E. Other Sources of Data

Sources of wood residue combustion emission data in this report are the same as in the earlier 'air toxic' compilation (2). However, as previously mentioned, in this report the wood residue boiler data are subjected to a different approach for determination of emission averages, and this approach is explained in the next section. Data on emissions from sludge combustion in wood residue-fired boilers and fossil fuel combustion can be found in NCASI Technical Bulletin No. 650 (2). 'Air toxic' emission data from the MACT sampling program for several miscellaneous semi-chemical, thermomechanical, and sulfite pulping and chemical recovery sources have been published in NCASI technical bulletins (14,19,20), and these are not reproduced here. Also excluded from this report are 'air toxic' emission data for fossil fuel-fired boilers and other boilers firing alternative fuels such as waste treatment system sludge, OCC rejects, non-recyclable recovered paper (NRP), tire-derived fuel (TDF), etc. Data on emissions from NRP burning and TDF burning can be found in NCASI Technical Bulletin No. 615 (25) and an EPA publication (26).

F. Conversion Factors

If mill-specific information was unavailable, nominal values for conversion factors were used. The conversion factors used for the various source categories were 3200 and 2800 lb liquor solids/ADTP for kraft and sulfite pulping, respectively; 6000 Btu/lb black liquor solids and 9000 dscf at 0 percent O_2 per 10^6 Btu for kraft recovery furnaces; 8 x 10^6 Btu/ton lime product and 550 lb CaO/ADTP for kraft mills; and 3200 lb liquor solids/ADTP and 6000 Btu/lb liquor solids for kraft smelt dissolving tanks.

III STATISTICAL TREATMENT OF DATA

NCASI Technical Bulletin No. 650 (2) comprised the first 'air toxic' emission data compilation for chemical wood pulp mills and boilers. In that report the methods for calculating averages for various sets of data were explained in Section III under "Treatment of Data." The average emission from a given source was represented by the arithmetic mean. Also, all "non-detects" (NDs) were included into the averaging process as long as one-half the detection limit for the non-detected compound was less than the highest value of a compound detected above the limit of detection.

As significant amounts of new data became available since the writing of the first report (2), it became clear that the above mentioned treatment of data to obtain a value representing emissions from a given source needed to be improved for at least two important reasons. First, the data sets typically available for analysis (20 or fewer measurements) have high variability, and the median, not the arithmetic mean, better represents the average. (Here, and throughout this document, average is used in a non-mathematical context to indicate usual, ordinary or typical.) Second, for data sets with over 50 percent censoring (or under 50 percent over the detection limit), some kind of statistical procedure to treat the data before obtaining an average is needed in order to avoid the significant upward bias that results from including non-detects at one-half the detection limit.

Relative to the first reason mentioned above, it should be noted that for most emission data reported in this bulletin, a significant spread in measured emissions from a given source was evident. This could be due to several reasons, including (i) differing operational characteristics of the unit operation at different facilities, (ii) variabilities in the characteristics of the feed to the unit operations, (iii) dissimilar measurement methods used by different measurement crews, (iv) unexplained or unreported upsets in normal or steady state operation, etc. The effect of choosing the median rather than the mean is to eliminate the artificial impact of "outliers," both high and low, on the data set average. Very often, the data set is such that one measured observation of large magnitude can bias the mean severely upwards. The median is always unaffected by such outliers.

The second reason why the previous method for determining representative averages needed to be improved relates especially to data sets where the majority of measured observations are below detection limits, yet because of one, two or three detected observations, all or most of the data set (often over 70 percent) assume finite values, and a significant portion of the data set becomes included in the average. An example of such a data set is given below:

0.50
0.013
0.0011
ND[0.90]
ND[0.63]
ND[0.53]
ND[0.25]
ND[0.096]
ND[0.058]
ND[0.013]
ND[0.012]
ND[0.0053]
ND[0.0011]
ND[0.00011]

This example data set contains 14 observations, 11 of which are values below some stated detection limit and three of which are above detection limits. One detected observation is two to three orders of magnitude higher than the other two detected observations. Based on the previous averaging process, this anomaly would cause all of the non-detects to be included in the average. Several non-detects are of such magnitude that at one-half the detection limit they far exceed two of the three detected measurements.

For the above reasons the "averages" of data presented in this report are estimated based on medians which are obtained either empirically or by subjecting the data to more rigorous statistical procedures. Three methods of determining the median of a data set are employed, viz.:

(a) empirical median (shown without asterisk in all tables)

(b) "NOR-PLOT" median (shown with one asterisk in all tables)

(c) "SDln" median (shown with two asterisks in all tables)

A. Empirical Median

The empirical median applies to all data sets with less than 50 percent censoring (or having 50 percent or more observations above detection limits). The data are ranked, and the median value is determined using the usual non-parametric approach (27).

B. NOR-PLOT Median

The NOR-PLOT median is used when the number of "hits" (i.e., fully quantified measurements) in a data set is ≥3 and >50 percent of the data are censored. The NOR-PLOT median or the median determined using the Regression of Normal Order Score (RNOS) technique (28) is described in NCASI Technical Bulletin No. 621, "Estimating the Mean of Data Sets that Include Measurements Below the Limit of Detection" (29). The superiority of this method over other statistical methods such as EPA's D-LOG statistical procedure for determining means and standard deviations has been demonstrated by Hinton (30). A statistical program called "NOR-PLOT" has been created by NCASI in electronic format. This program allows for determination of the "real space" mean (xmean) and standard deviation (xsd) of a log-normally distributed data set from the "log space" mean (ymean) and standard deviation (ysd) obtained using the RNOS technique. ("Real space" refers to values in the original measurement scale while "log space" refers to values in the log-transformed domain.) The NOR-PLOT median (xmed) of this data set is given by:

$$\text{NOR-PLOT median} = \text{xmed} = \exp(\text{ymed}) \quad (1)$$

where

$$\text{ymed} = \text{ymean} = \log(\text{xmean}) - 0.5 * \text{ysd}^2 \quad (2)$$

and

$$\text{ysd}^2 = \log[(\text{xsd})^2/(\text{xmean})^2 + 1.0] \quad (3)$$

C. SDln Median

The SDln median is used when the number of "hits" (i.e., fully quantified measurements) in a data set is <3 and over 50 percent of the data are censored. Based on an assumption about the parent population's distribution type and variability, this approach predicts a data set's 50th percentile value (i.e., median) by scaling the available estimate of the smallest detected measurement value. The calculation technique to estimate the SDln median is outlined in Appendix A.

The use of this method requires the estimation of an average coefficient of variation ($C_v$avg) representative of the entire parent population for a given source. C_v, as defined here, is the ratio of the NOR-PLOT standard deviation (xsd) to the NOR-PLOT mean (xmean). For a given source, C_vs are first determined for all emission data sets to which the NOR-PLOT method described in Section III-B can be applied, and which also satisfy certain additional requirements (see Appendix A). The median of these C_vs, $C_v$avg, is taken to represent the coefficient of variation of the parent population for that source. The SDln Median (X_{50}) of each data set for this source is then given by:

$$\text{SDln Median} = X_{50} = \exp(-z_j * SD_{ln}) * X_j \quad (4)$$

where

SD_{ln} = log-space standard deviation = $\sqrt{\ln[C_v^2\text{avg} + 1]}$

j = observation rank of minimum detected measurement value in data set

z_j = inverse normal cumulative distribution function value for cumulative probability at rank j

and

X_j = minimum detected measurement value in data set at rank j

A detailed discussion on the results obtained using the NOR-PLOT and SDln median determination methods is given in Appendix A. Table 2A provides a summary of the range and median of the coefficients of variation obtained for emissions from several sources using the NOR-PLOT method. The significant spread in measured emissions from all sources provided median C_v estimates ranging from 1.0 to 27.1, which are large compared to those for most data sets representing chemical concentration or mass loading data. According to EPA, a C_v "value of 0.6 is typical of the range of variability of effluents measured by EPA and represents a reasonable degree of relative variability" (31). For the log-normal distribution commonly assumed (and used here) to model such data sets, a large C_v results in a large disparity between the median value and larger values in the data set. In other words, increasing C_v increases the disparity. The example Table 2B shows theoretical ratios of medians to extreme values representing the 87, 92 and 97 percentiles of log-normally distributed data sets with variability encompassing $0.5 < C_v < 16$. The 87, 92 and 97 percentiles were used in the example calculations to represent a data set of 20 observations with 3, 2 and 1 hits, respectively. For the data set variability exhibited by the air emission data discussed in this bulletin, the results in Table 2B suggest that median values should be less than 10 percent of the largest data set value in many instances. This is clearly borne out by the maximum and median values reported in Tables A-1 through A-4 of Appendix A. Tables A-1 through A-4 of Appendix A contain summary statistical information derived for emissions data corresponding to black liquor oxidation tank vents, kraft mill bleach plant vents, smelt dissolving tank vents and DCE kraft recovery stacks, respectively.

For the case of all non-detected observations, the largest ND value is the best estimate of an upper limit to the magnitude of an extreme event, and therefore an upper limit to the median value of such a data set should be less than 10 percent of the largest ND value in many instances. However, as the significance of the average of a data set comprised of all non-detected observations is very difficult to interpret, for purposes of this bulletin the average is denoted just by an ND, and the exact numerical significance of this ND is left to the reader's judgement and interpretation.

IV TEST METHODS

Several test methods were utilized for the measurement of volatile organic compounds, a few inorganic compounds and trace metals in the various testing studies. For the 16 mill NCASI MACT study, the sampling and analytical methods, data handling protocols, and quality assurance/quality control procedures are summarized in NCASI Technical Bulletin No. 684 (21). The test methods are identified by acronyms, when available, in each of the tables presented in this report. The test methods used and their acronyms for volatile organic compounds, inorganic 'air toxic' compounds and trace metals are presented below.

A. Volatile Organic Compounds and Inorganic Gaseous Compounds

(1) CARB 410A - California Air Resources Board Method for Benzene.

(2) CARB 421 - California Air Resources Board Method for Hydrochloric Acid.

(3) CARB 422 - California Air Resources Board Method for Halocarbons.

(4) CARB 429 - California Air Resources Board Method for Polycyclic Aromatic Hydrocarbons.

(5) CARB 430 - California Air Resources Board Method for Formaldehyde and Acetaldehyde.

(6) MM6 - EPA Reference Method 6 for Sulfur Dioxide Modified to Measure Ammonia.

(7) M8 - EPA Reference Method 8 for Sulfuric Acid.

(8) M0011 - EPA Draft Method 0011 for Aldehydes/Ketones.

(9) Modified NIOSH - Modified NIOSH Methods for Methanol.

(10) M16 - EPA Reference Method 16 for total reduced sulfur compounds.

(11) M18 - EPA Reference Method 18 - direct interface sampling using gas chromatography with a flame ionization detector.

(12) M26, M26A - EPA Reference Methods for Hydrogen Chloride.

(13) NCASI Methods - Methods developed by NCASI:

(a) Methanol, Acetone, Methyl Ethyl Ketone and Acetaldehyde - "The NCASI Water Impinger/Silica Gel Method for Methanol, Acetone, Methyl Ethyl Ketone and Acetaldehyde," Draft Method.

(b) Chloroform - NCASI Technical Bulletin No. 531, "Development, Evaluation, and Protocol of Methods for Source Sampling and Analysis for Chloroform in the Presence of Chlorine and Chlorine Dioxide."

(c) Chlorine and Chlorine Dioxide - NCASI Technical Bulletin No. 520, "Optimization and Evaluation of an Impinger Capture Method for Measuring Chlorine and Chlorine Dioxide in Pulp Bleach Plant Vents."

(14) Heated Canister - NCASI/Weston Heated SUMMA™ Canister Method for Volatile Organic Compounds - The sample gases are analyzed on a gas chromatograph equipped with a flame ionization detector (FID) using either a whole gas sample or cryogenically concentrated sample. A mass selective detector in most cases was used to confirm the presence of compounds identified from gas chromatographic analysis.

(15) RTI Draft - Research Triangle Institute procedure using DNPH described in "Development and Validation of a Test Method for Formaldehyde Emissions."

(16) SEMI-VOST - Semivolatile organics collected by EPA Method 0010, extracted with methylene chloride, and analyzed by GC/MS according to EPA Method 8270.

(17) VOST - Volatile Organic Sampling Train - organics collected according to EPA Method 0030 and analyzed by thermal desorption gas chromatography/mass spectroscopy (TDGC/MS) according to EPA Method 5040.

Besides the above methods for measurement of organic and inorganic non-metal 'air toxics,' EPA Reference Methods 25 and 25A (M25 and M25A) were used to measure total hydrocarbons, and EPA Reference Method 10 (M10) was used to measure CO emissions from bleach plant vents and one O_2 delignification system vent.

B. Trace Metals

(1) CARB 101A - California Air Resources Board Method for Mercury.

(2) CARB 424 - California Air Resources Board Method for Cadmium.

(3) CARB 425 - California Air Resources Board Method for Total Chromium and Hexavalent Chromium.

(4) CARB 436 - California Air Resources Board Method for Multiple Metals.

(5) EPA Draft MM - EPA Draft Multi-Metals Method, "Methodology for the Determination of Metals Emissions in Exhaust Gases from Hazardous Waste Incineration and Similar Combustion Processes," October 29, 1990.

(6) M0012 - EPA Draft Method for Trace Metals.

(7) M29 - EPA Reference Method 29 using metals train. Analysis performed by inductively coupled plasma emission spectroscopy, graphite furnace atomic absorption spectroscopy or cold vapor atomic absorption spectroscopy (mercury).

V BLEACH PLANT EMISSIONS

Emissions of several organic 'air toxics,' Cl_2, ClO_2, HCl, terpenes and THCs from 52 bleach plants are presented in Table 3. Information concerning the specifics of each bleach plant, such as bleaching sequence, pulp type, bleaching capacity, percent ClO_2 substitution, chlorine/chlorine dioxide scrubbers, number of vents tested and whether or not O_2

delignification preceded bleaching is also presented in Table 3. Some bleach plants were tested both before and after installation of O_2 delignification.

A total of 64 volatile organic and chlorinated compounds were measured in the emissions from these 52 bleach plants. Also shown in Table 3 are some recent emission data for Cl_2, ClO_2 and HCl and for CO, terpenes and THCs. It should be noted that more detailed information on Cl_2 and ClO_2 emissions from bleach plants and their control is given in NCASI Technical Bulletin No. 616 (32). Some organic compounds were measured in one or two bleach plant vents only, and these emission data should be used with caution. Volatile organic and chlorinated compounds most prominent in bleach plant emissions included Cl_2, ClO_2, methanol (CH_3OH) and chloroform ($CHCl_3$).

Several factors influence the emissions of chlorinated compounds from bleach plants. The bleaching sequence (which influences the bleaching chemicals used) and level of bleaching (final brightness) are expected to affect emissions of Cl_2, ClO_2 and $CHCl_3$. Other factors such as residual Cl_2 and ClO_2 have been shown to strongly influence emissions of Cl_2 and ClO_2 (32). The factors influencing the emissions of volatile organic compounds besides chloroform from bleach plants are not well understood.

No data for the kappa number entering or leaving the bleach plant were available for the bleaching sequences in Table 3. The final pulp brightness for each sequence was not available either. Percent ClO_2 substitution in these 52 bleaching sequences ranged from 0 to 100 percent. Factors influencing $CHCl_3$ emissions have been covered in NCASI Technical Bulletins Nos. 558 and 605 (33,34). Based on these NCASI studies an estimating procedure for chloroform generation and emission under different bleaching sequences has been developed. For low levels of hypochlorite use in bleaching (<0.1 percent hypochlorite), this procedure has been reproduced in Table 3A. The use of hypochlorite is perhaps the single largest factor influencing the formation and emission of $CHCl_3$ from bleach plant vents. A few of the bleaching sequences in Table 3 used hypochlorite, and these bleaching sequences generally experienced the highest level of $CHCl_3$ emissions. Chloroform emission estimating procedures for higher levels of hypochlorite use are shown in Table 3B (33,34).

Most bleach plants have a scrubber or scrubbers for controlling Cl_2 and ClO_2 emissions from the bleach plant. These scrubbers can impact the level of VOC emissions from bleach plants. The scrubber solution used in the scrubber may, and often does, contain various volatile organics. These organics can be stripped from the scrubber solution and emitted into the scrubber vent gases. Generally, the scrubber solution is alkaline to aid in scrubbing the chlorine-containing acid gases from the bleach plant vents. White liquor, caustic or filtrate from an alkaline stage of bleaching is used as the scrubber solution. Often the vent gases from alkaline stages of bleaching (E-stages) are not routed to the Cl_2 or ClO_2 scrubbers because these vent gases usually do not contain Cl_2 or ClO_2. Vent gases from E-stages may, however, contain VOCs.

Bleaching temperatures are also likely to affect the amount of VOCs formed and released during bleaching. The quality of the shower water used on the bleach plant washers

can contribute to VOC emissions from the bleach plant. The type of wood and corresponding pulp bleached may have an impact on the VOC emissions from the bleach plant, although this has not been demonstrated.

Methanol is the most prominent organic compound emitted from bleach plants. The median emission of 51 bleach plants was about 0.12 lb/ADTBP, ranging from ND to 4.1 lb/ADTBP. Emissions of methanol from bleach plant vents are affected by various factors including (a) the type of wood pulped (hardwood vs softwood), (b) O_2 delignification preceding the bleach plant, (c) percent substitution by ClO_2, (d) amount of methanol in ClO_2 solution used in bleaching, and (e) degree of removal of methanol from pulp in brownstock washing. NCASI Technical Bulletin No. 666 (35) reported on laboratory studies to investigate amounts of methanol, acetone, and MEK generated in the chlorination and extraction stages as a function of brownstock species, brownstock kappa number, chlorination stage kappa number, and chlorination stage ClO_2 substitution.

In light of all these factors which can influence VOC emissions, averages for volatile organic emissions given in Table 3 should be used with caution. A special note of caution is warranted for the HCl emission data. Seven bleach plant vents were tested using EPA Methods 26 and 26A. However, neither of these methods has been validated for bleach plant vents. These methods may very well result in the reporting of chlorides other than gaseous HCl as HCl.

Table 3 also contained carbon monoxide emission data for 14 bleach plants. Carbon monoxide has been known to be produced during bleaching in the chlorination, extraction and chlorine dioxide stages, although the major source of CO is the chlorine dioxide stage (38,39). The CO generated depends on (a) the lignin content of the pulp [oxygen bleached (or delignified) pulp generated proportionately less CO than unbleached pulp], and (b) the amount of ClO_2 charged (with a higher charge, more CO was formed, especially in the case of unbleached softwood) (39).

VI PULP MILL EMISSION SOURCES

A. Oxygen Delignification Systems

Table 4 presents volatile organic emissions data from 10 oxygen delignification reactor systems. All emission vents from these 10 reactor systems were tested, which included the blow tank vent and all post-reactor washer and chest vents, as noted in Table 4. A total of 37 volatile organic compounds were identified in the vent gases of these ten O_2 delignification systems. Only one O_2 delignification system vent was tested for CO emissions, and one was tested for o-cresols. More data will be needed before these emissions, especially o-cresols, can be considered representative.

The most prominent VOC emitted is methanol, with a median emission of 0.98 lb/ADTUBP (range - 0.32 to 1.91). The causes for VOC emissions from O_2 delignification reactor systems include: (1) the presence of these VOCs in the pulp being delignified, (2) the presence of these VOCs in the mill process water used in the showers, and (3) the VOC products generated by the reaction of O_2 with lignin. Besides individual VOCs, emissions of terpenes and THCs were also measured, and these are reported in Table 4.

B. Brownstock Washers

Table 5 provides volatile organic compound emission data from 37 brownstock washing systems. For some of these washing systems, as shown in Table 5, the washer hoods were the only vents tested. It was not clear from the reports available to NCASI whether emissions from other related sources such as filtrate, foam or screen tanks were also directed to these hoods. Thus, the results for these washers may not represent total emissions from the brownstock washing system. However, for the majority of brownstock washing systems shown in Table 5, all related vents were tested, and the emissions given represent total emissions from these systems. For each brownstock washing system, Table 5 also shows the type of pulp processed, type of washer, washer capacity and nature of vents tested.

Volatile organic emissions from brownstock washers may be related to several factors which include: (1) the particular washing system, such as vacuum, pressure, diffusion, compaction baffle or belt washer due to their vastly different vent gas flow rates, (2) the temperature and volatile organics concentration of the shower water, (3) the pulp and liquor quality prior to washing (i.e. degree of cooking, etc.), and (4) the type of wood pulp processed (SW vs HW). These factors do vary considerably from mill to mill.

The data presented in Table 5 suggest that, in general, vacuum drum washer systems emit more volatile organics than diffusion, pressure, compaction baffle or belt washers, which is probably due to the higher vent gas flow rates associated with these type of washers. Emissions from vacuum drum washers are listed separately from pressure, diffusion belt and compaction baffle type washers, which have much lower vent gas flow rates.

In NCASI Technical Bulletin No. 678 (15), the quality of the shower water used on brownstock washers was found to strongly influence the VOC emissions from the washer system. A relationship between shower water concentration and emissions was developed for methanol for six systems with vacuum drum washers. Unfortunately, only limited data for the organic concentrations in the shower water are available for the other systems listed in Table 5, and no detailed correlation of VOC emissions with shower water organic concentrations can be made for these other systems. A more detailed NCASI study correlating shower water methanol, MEK, acetone and acetaldehyde concentrations with emissions is currently under way.

A total of 56 different volatile organic compounds were identified in the emissions from these brownstock washers. Methanol is the most prominent VOC for vacuum drum washing (VDW) systems at a median emission rate of 0.74 lb/ADTUBP (range - 0.09 to 6.1).

Dimethyl disulfides and dimethyl sulfides are the next two largest emissions from VDW systems. Several VOCs were measured at only one source, and these values should be used with caution. Besides individual VOCs, Table 5 also provides emissions of H_2S, terpenes and THCs.

C. Uncontrolled Noncondensible Gases

Kraft pulp mill noncondensible gases vented from digesters, blow tanks, multiple-effect evaporators and foul condensate strippers are generally collected and burned in a combustion device. However, occasionally these gases are vented to the atmosphere and, in such cases, it may become necessary to estimate the level of volatile organic emissions in these vented gases. Table 6 provides volatile organic emission data from the above four kraft pulping operations. Some emission data for H_2S and other sulfur-containing compounds are also included in Table 6.

Various uncontrolled NCGs were measured in eight kraft pulp mills. Specifics about these pulping operations are presented in Table 6. All NCGs from kraft operations were measured at two mills with strippers. For one mill, NCGs from the digesters, evaporators and strippers were collectively sampled after the white liquor scrubber but prior to combustion in the lime kiln. For the second mill, NCGs from digester and evaporator areas were scrubbed, but the stripper gases were not, and the collective gases were sampled before incineration in a lime kiln. For three mills with no strippers or white liquor scrubbers, the total NCGs from pulping and evaporator areas were measured. For one mill, combined pulping and evaporator NCGs were measured after a white liquor scrubber. These data represent uncontrolled emissions for volatile organic compounds from combined kraft mill digester and evaporator sources. It should be noted, however, that perhaps with the exception of TRS compounds (H_2S and methyl mercaptan), the scrubbers on NCG systems may not significantly affect the removal of other compounds, especially VOCs.

In nine mills, NCGs from only the kraft pulping operations, viz., digesters and blow tanks, were measured separately. For eight of these mills, the digester and blow tank NCGs were measured uncontrolled or prior to passing through a white liquor scrubber. One blow heat recovery vent was tested after a white liquor scrubber.

For three mills, NCGs from only the evaporators were measured separately. For two of these mills, the evaporator NCGs were measured uncontrolled or prior to passing through a white liquor scrubber. At one mill the foul condensate stripper gases were tested separately.

A total of 44 volatile organic compounds were measured in the vent gases from digester, blow tank, evaporator and foul condensate stripper sources. Some of these NCGs, as noted above, were tested after a white liquor scrubber. The level of volatile organic compounds in these NCGs is expected to be extremely mill-specific, and great caution should be exercised when using or interpreting these data. For example, methanol emissions from the four total NCG streams without strippers ranged from non-detect at 0.0022 lb/ADTUBP to 0.52 lb/ADTUBP, and methanol emissions in the NCG streams from the nine digester systems

ranged from 0.0003 lb/ADTUBP to 1.2 lb/ADTUBP. Such a wide variation in methanol emissions from similar sources in mills is probably indicative of the vast differences in the kraft pulping process, operation of digester, evaporator and stripper systems (especially relative to operation of condensers) and treatment of these NCGs at these mills.

D. Black Liquor Storage Tanks

Table 7 presents the volatile organic emissions from a total of eight black liquor storage tanks in five mills. Three weak liquor tanks, one intermediate liquor tank and four heavy liquor tanks were tested. As weak and strong (including intermediate) liquors can have different levels of dissolved organics, these are shown separately. All emissions are shown in lb/hr/tank units, rather than lb/ton pulp. This was based on the fact that black liquor tank volatile organic emissions are influenced mainly by the level of VOC dissolved in the black liquor, its temperature and the vent gas flow rate. The temperature of the black liquor, not the amount of black liquor, determines the equilibrium concentration of any VOC above the liquor in the tank headspace. Vent gas flow rates are determined by filling/emptying cycles, temperature gradients and other tank design parameters. None of these factors is directly related to the pulping capacity at a mill. Total mill-wide VOC emissions from black liquor storage tanks can therefore be quite mill-specific.

Emissions for 38 volatile organic compounds are included in Table 7 for black liquor storage tanks. Terpenes and THC emissions, the latter as measured by Method 25A, are also included in Table 7. The most predominant VOC emitted from black liquor storage tanks is, as expected, methanol.

E. Pulp Storage Tanks

Table 7 also presents data on volatile organic emissions from five pulp storage tanks in three pulp mills. VOC emissions were measured from three types of brownstock or pulp storage tanks - screened stock, wash stock and high density stock storage tanks. Data for two other high density pulp storage chests, tested during the 16 mill NCASI MACT study, are not included in Table 7. These two chests, as explained in NCASI Technical Bulletin No. 677 (14), had unusually high vent gas flow rates which caused the emissions to be much higher than for the five tanks listed in Table 7.

Table 7 includes emission data for 41 different volatile organic compounds from unbleached pulp storage tanks. Terpenes and THC emission data are also included in Table 7. Besides dimethyl sulfides and disulfides the most prominent VOC emitted from pulp storage tanks was methanol. VOC emissions from pulp storage tanks can be quite mill-specific, as seen in the emission range for each VOC in Table 7. The quality of the water associated with the pulp in the storage tank and other factors outlined in Section D for liquor storage tanks that determine vent gas flow rates, may be expected to influence VOC emissions from these tanks.

F. Deckers

Table 8 summarizes the volatile organic compound emission data for six decker systems. Three deckers were processing hardwood pulp and three deckers were processing softwood pulp. Deckers are used for additional pulp washing and to control pulp consistency. Air emissions from deckers would be expected to be similar but of lesser magnitude than air emissions from brownstock washers.

The quality of the pulp washed in brownstock washers and the quality of the shower water used on the decker (if a shower is present) is likely to contribute to the potential for volatile organic compound emissions from deckers. The type of pulp (hardwood or softwood) may also influence VOC emissions from deckers, but no definitive data are available to support this. The vent gas flow rates and the temperature in the decker may also influence VOC emissions.

Table 8 presents emission data for 46 volatile organic compounds from these deckers. Also shown are emissions of terpenes from two deckers and THCs from three deckers. Although in three decker systems only the hood vent was tested while the remaining three included other sources such as the filtrate tank vent and seal pit vent, the hood vents would be expected to account for the bulk of decker-related air emissions. Methanol is the most dominant VOC emitted from deckers, with a median emission rate of 0.05 lb/ADTUBP.

G. Thermal Oxidizers

Table 9 summarizes the volatile organic emissions from five NCG thermal oxidizers in five kraft mills. One of the five NCG thermal oxidizers had a wet scrubber on the oxidizer exhaust. NCG thermal oxidizers are used to separately incinerate the collected noncondensible gases from kraft pulping operations. These thermal oxidizers can use oil or gas as fuel, but most use gas (natural gas or propane).

Emissions for 39 volatile organic compounds from thermal oxidizers are included in Table 9. Also shown are sample emissions from one thermal oxidizer of H_2S (non-detect), SO_2, NO_x and CO, emissions of terpenes from three oxidizers and THC emissions from four oxidizers. It should be cautioned that THC emissions using EPA Method 25A could also be affected by unburned fuel (CH_4 or C_3H_8) which causes an FID response. Table 9 shows that the emissions for most of the VOCs were non-detect, suggesting fairly complete combustion of the NCGs. As before, when data are available for only one source, these data should be used with caution.

Emissions of VOCs from NCG thermal oxidizers can be quite mill-specific depending on the organic makeup of the NCGs to be incinerated. However, with efficient combustion in these stand-alone incineration devices, the VOCs should be essentially converted to CO_2 and H_2O. TRS compounds are converted to SO_2 in a thermal oxidizer. For those NCG thermal oxidizers with a wet scrubber for SO_2 control, the wet scrubber solution can contribute to VOC emissions from the NCG thermal oxidizer stack.

H. Sulfite Pulping Area Sources

Table 10 presents volatile organic compound emission data from sulfite pulping area sources. Emission sources for which data were available include two redstock washers, two nuisance scrubbers, one bleach plant, one combined digester evacuation vent and one combined blow pit vent. These data should be used with caution since only information from two mills was available. All the emission data for these two mills were obtained during the NCASI MACT study, and these have been described in detail in NCASI Technical Bulletin No. 682 (19). A total of 28 volatile organics were measured in the emissions of these sulfite pulping area sources. Total hydrocarbon emissions and emissions of terpenes were also measured. Methanol is, once again, the dominant VOC emitted.

VII CHEMICAL RECOVERY AREA SOURCES

A. Black Liquor Oxidation Systems

Table 11 presents volatile organic emissions data for 16 black liquor oxidation (BLOX) systems. All 16 systems oxidized strong black liquor. Most of the 16 systems use single stage oxidation. A total of 71 volatile organic compounds were identified in the emissions from these 16 BLOX systems, as well as H_2S and other reduced sulfur compounds such as CS_2 and COS. Emissions of total hydrocarbons from six BLO tank vents and terpenes from five tank vents are also shown in Table 11. The most dominant VOC emitted is methanol, with a median emission factor of 0.24 lb/TBLS (ton of BLS). Single source measurements should be used with caution.

VOC emissions from BLOX systems are most likely largely due to their presence in the black liquor itself. The level of gas-liquid agitation and the vent gas flow rate will also influence these emissions. Oxidation of dissolved lignin in the BLOX reactor is also expected to contribute, but to a lesser extent. Volatile organic compounds present in black liquor vary with the type of wood (hardwood or softwood) pulped, the geographic location of the wood species (north vs south) and the quality of the raw chemicals used in the kraft pulping process.

B. Kraft DCE Recovery Furnaces

Table 12A presents data for volatile organic compound emissions from 21 kraft recovery furnace stacks where each furnace had a direct-contact evaporator (DCE). Three of the stacks had multiple recovery furnaces venting through them. Each of these DCE recovery furnaces is equipped with a wet bottom precipitator (ESP). Two mills with DCE recovery furnaces have a wet scrubber following the precipitator.

Table 12A includes emissions data for 68 different volatile organic compounds. It also includes emissions data for HCl, reduced sulfur compounds, PAHs, H_2SO_4, terpenes and total

hydrocarbons. For HCl emissions, results from the four DCE furnaces studied and reported in NCASI Technical Bulletin No. 674 (36) are also included. Emissions of compounds for which only one source was tested should be used with caution. Median emissions are shown for all compounds when more than one source was tested. Non-detected (ND[x.xx]) values were included in the estimation of medians according to the data treatment procedures presented in Section III.

Emissions of volatile organic compounds from DCE recovery furnaces are quite mill-specific. Factors which could influence emissions include: (1) quality of black liquor entering the DCE, (2) type and quality of makeup chemicals used in the kraft liquor cycle, (3) evaporator and precipitator designs, and (4) combustion conditions in the recovery furnace. Concentrated black liquors may contain differing amounts of methanol and other dissolved VOCs, depending on the amount generated in or stripped by black liquor oxidation systems which precede the DCE furnace. Makeup chemicals added to the saltcake mix tank could contain significant concentrations of volatile organic compounds. In cascade and cyclone evaporators, hot flue gases resulting from combustion in the lower furnace are brought into direct contact with strong black liquor, providing an opportunity for many of the volatile organic compounds to be stripped from the black liquor into the flue gas. The design and operational characteristics of the evaporator (cascade or cyclone) would influence the degree of flue gas/black liquor contact. The design and liquor flow pattern in the wet bottom ESP on a DCE furnace could influence VOC transfer from black liquor to flue gas. Finally, the quality of the black liquor burned (hardwood, softwood, heating value, organics/inorganics ratio, solids content) and the efficiency of combustion would be expected to contribute to the type and quantity of volatile organic compounds formed during combustion.

The factors influencing emissions of HCl from kraft recovery furnaces are studied in detail in NCASI Technical Bulletin No. 674 (36). The level of SO_2 in the stack was shown to correlate very well with levels of HCl for non-contact furnaces, but not so satisfactorily for direct contact furnaces. Sulfuric acid emissions from kraft recovery furnaces were studied over a decade ago and reported in NCASI Atmospheric Quality Improvement Technical Bulletin No. 106 (40). The additional data from three furnaces, along with the data for two furnaces from that previous study, suggest that the level of H_2SO_4 emissions is extremely small, especially considering the high levels of sulfur in the black liquor burned.

Methanol is the most dominant organic compound emitted from DCE kraft recovery furnaces, with a median emission rate of 0.20 lb/ton BLS (range - ND to 1.35). Hydrochloric acid is the next largest 'air toxic' emitted, with a median emission of 0.09 lb/ton BLS.

Table 12B provides a summary of trace metal emission data for 13 DCE recovery furnaces. Seventeen different trace metals are included in this summary, including one source tested for hexavalent chromium. Phosphorus, though tested for, is a non-metal. Trace metal emissions from recovery furnaces likely depend largely on the intensity of liquor combustion within the furnace and less on the concentrations of these metals in the kraft black liquor burned. The existence of trace metals in kraft black liquor and their subsequent accumulation are dependent on the type and geographic location (north/south) of the wood species pulped

and the quality of the makeup chemicals used in the kraft pulping process. However, on a short-term basis, the factors most likely to influence trace metal emissions from kraft recovery furnaces include: (1) intensity of combustion in the lower furnace (as measured indirectly by lower furnace temperature) and (2) the particulate collection efficiency.

C. Kraft NDCE Recovery Furnaces

Table 12C presents data on volatile organic compound emissions from 18 non-contact kraft recovery furnaces. Four recovery furnaces were equipped with wet bottom precipitators (ESPs), and the remainder were equipped with dry bottom ESPs. One recovery furnace was equipped with a wet scrubber following a dry bottom ESP.

Table 12C includes emission data for 49 different volatile organic compounds, most of which are on the 1990 Clean Air Act Amendments list of 189 'hazardous air pollutants.' Also shown is a summary of total hydrocarbon emissions and emissions of HCl, sulfuric acid, reduced sulfur compounds (including CS_2), PAHs and terpenes. The ten furnaces tested by NCASI for HCl and reported in Technical Bulletin No. 674 (36) are also included in Table 12C.

Emissions of organic compounds from NDCE recovery furnaces can be quite mill-specific. The description given above for DCE recovery furnaces relating the impact of liquor characteristics and combustion upon the level of volatile organic emissions is also valid for NDCE recovery furnaces. Since the hot flue gases in the NDCE do not make contact with the black liquor, generally, less volatile organic compounds are emitted from NDCE recovery furnaces compared to DCE recovery furnaces. As for DCE furnaces, NDCE recovery furnaces with wet bottom ESPs have the potential for volatile organic compounds to transfer from the black liquor in the wet bottom ESP into the flue gases. The factors affecting emissions of HCl for NDCE furnaces were discussed in the previous section for DCE furnaces. As H_2SO_4 emissions comprise a fine sub-micron mist, the factors affecting their emissions are also similar to those for DCE furnaces.

Methanol is the most dominant VOC emission from NDCE kraft recovery furnaces, with a median emission rate of 0.05 lb/ton BLS (range - ND to 0.27). HCl emissions are also comparable in magnitude, with a median of 0.06 lb/ton BLS (range - ND to 1.23). Sulfuric acid emissions have a higher median emission rate than for DCE furnaces, although the reason for this is not evident.

Table 12D provides a summary of trace metal emissions data for ten NDCE recovery furnaces. A total of 17 different trace metals and phosphorus are included in this summary. Trace metal emissions from recovery furnaces depend largely on the intensity of combustion in the furnace and less on the presence of these trace metals in the black liquor being burned. The existence of trace metals in black liquor would likely be dependent on the type and geographic location (north/south) of wood pulped and the quality of makeup chemicals used in the kraft pulping process. However, just as for DCE furnaces, short-term factors such as intensity of combustion (as measured indirectly by lower furnace temperature) in the lower

furnace and the ESP particulate collection efficiency may be more instrumental in determining NDCE furnace trace metal emission levels.

D. Sulfite Recovery Furnaces

Table 13A presents available volatile organic compound emission data from five sulfite recovery furnaces - three ammonia-based and two magnesium-based. In sulfite pulping mills, unlike kraft recovery furnaces, other sources associated with sulfite pulping and SO_2 recovery are generally vented through a common stack with the recovery furnace flue gas. Limited process data accompanied most of these emission data, and thus these data should be used with caution. Emission data for 37 different volatile organic compounds are included in Table 13A. Also included are limited data for emissions of CS_2, HCl, terpenes and total hydrocarbons.

Table 13B presents trace metal emissions data from one magnesium-based sulfite recovery furnace. A total of 11 trace metals were analyzed for during this testing.

E. Lime Kilns

Table 14A summarizes volatile organic emissions data from 28 lime kilns. Twenty-two of these lime kilns had wet scrubbers (venturi scrubbers) and used fresh water or clean condensate for scrubber solution. Three lime kilns had ESPs for particulate emission control. One lime kiln had a wet scrubber and an ESP. Two lime kilns had mist eliminators instead of venturi scrubbers. Most of these lime kilns used natural gas for fuel; however, a few kilns were tested using oil for fuel, as shown in Table 14A. NCGs are burned in most of these lime kilns; however, several kilns did not burn NCGs. In Technical Bulletin No. 650 (2) it was shown from limited data that VOC emissions from lime kilns were essentially the same when burning or not burning NCGs. Maintaining conditions for complete combustion is perhaps the key factor in controlling lime kiln emissions of VOCs.

A total of 54 volatile organic compounds, as well as H_2S, CS_2, terpenes, and THCs were measured in the emissions from these lime kilns as shown in Table 14A. Where emission data for a particular compound are available from only one source, they should be used with caution. Naphthalene is the most dominant VOC emitted, although test data for only two kilns were available. Methanol is the next most dominant 'air toxic' VOC emitted (median = 0.007 lb/ton CaO) followed by formaldehyde and acetone.

Several factors play a role in determining the type and quantity of organic emissions from lime kilns prior to the control device. Two obvious factors are the fossil fuel combusted and the efficiency of combustion. The level of organics in the water or condensate used for lime mud washing could also contribute to organic emissions from the lime kiln. The lime mud entering the kiln contains a considerable amount of this wash water (~30 percent). This water is evaporated in the kiln, and any dissolved organics if not combusted will be emitted from the kiln.

The most important factor contributing to organic emissions from lime kilns with scrubbers is perhaps the concentration of organics in the scrubbing solution. This is a function of the quality of the makeup solution, the recirculation rate and the concentration of organics in the kiln gases. As shown in Table 14A, the makeup for the scrubbing solution used in these lime kiln scrubbers (when reported) was fresh water, condensate or weak wash. Fresh water should be essentially free of dissolved organics, whereas condensate and weak wash could contain significant concentrations of dissolved organics. While potentially contributing to organic emissions from the kiln by stripping organics from the scrubbing solution, a wet scrubber can also aid in removing organics by either dissolving the organics in the scrubbing solution or causing organics to react with the scrubbing solution. An ESP would not have such an impact of either aiding in the removal of or addition to volatile organic emissions.

Table 14B summarizes trace metal emissions from 13 lime kilns. A total of 18 trace metals and the non-metal phosphorus are identified in the emissions from these lime kilns. All of the lime kilns tested for trace metal emissions had wet scrubbers for particulate control. Trace metal emissions from lime kilns with ESPs may be less than trace metal emissions from lime kilns with wet scrubbers, although no data are available to corroborate this. ESPs typically have higher particulate removal efficiencies than wet scrubbers which may result in lower trace metal emissions, at least for those metals not in gaseous form.

F. Smelt Dissolving Tanks

Table 15A summarizes volatile organic emission data from 26 smelt dissolving tank vents. Particulate control devices on these smelt dissolving tanks include venturi scrubbers and mist eliminators. A total of 65 different volatile organic compounds were identified in the emissions from these smelt dissolving tanks. Also shown are available air emission data on ammonia, reduced sulfur compounds (including H_2S, CS_2, COS), terpenes and total hydrocarbons.

Most of these smelt dissolving tank scrubbers used weak wash, which can contain fresh water, mill water, clean condensate or some combination of these. Information on the scrubber solution for some of these scrubbers was not available. Two scrubbers were known to use fresh water directly for scrubber solution makeup. In most mills weak wash is used to dissolve the recovery furnace smelt.

Volatile organic emissions from smelt dissolving tanks result from two sources: (1) the dissolved VOCs in the water used to dissolve the smelt and (2) the dissolved VOCs in the water used as the scrubber solution. In the case of some VOCs, the scrubber solution can absorb VOCs from the smelt dissolving tank vent gas or react with VOCs in this vent gas to reduce the emission of these VOCs. Methanol is the most prominent organic 'air toxic' emission from smelt dissolving tanks with a median emission of 0.01 lb/ton BLS and a range of ND to 0.58 lb/ton BLS. However, ammonia is by far the most prominent inorganic 'air toxic' emission with a median emission of 0.05 lb/ton BLS (range - 0 to 4.1 lb/ton BLS).

Table 15B summarizes available trace metal emission data for four smelt dissolving tanks. A total of 16 trace metals and the non-metal phosphorus are included in this table.

G. Tall Oil Reactor Systems

Table 16 summarizes volatile organic emissions from six tall oil reactor systems. All six reactors were operated in the batch mode with each batch reaction lasting from 2-6 hours. The exhaust gases from four reactors were routed through a packed tower scrubber that used either white liquor or 20 percent caustic for scrubbing solution. One tall oil reactor did not scrub the reactor gases before release to the atmosphere. A total of 41 volatile organics were identified in the emissions from these six tall oil reactor systems, as well as H_2S, CS_2, terpenes and THCs. The most prominent VOC was methanol, with a median emission factor of 0.13 lb/ton tall oil (TTO). Alpha-pinene and beta-pinene were identified in the emissions from three of these tall oil reactor systems at varying levels from non-detect to 7.7 lb/TTO. Total hydrocarbon emissions from five tall oil reactors ranged from 0.11 to 9.8 lb/TTO, with a median of 2.9 lb/TTO. Typical tall oil yields in lb/ton pulp for various parts of North America are 90 for southern states, 80 for mid-Atlantic states, 40 for Canada, 125 for southwestern states, 50 for east of the Cascades and 30 for west of the Cascades (41). These yields may be used to convert emission estimates from lb/TTO to lb/ton pulp.

H. Causticizing Area Vents

Table 17 summarizes volatile organic emissions and emissions of terpenes, THCs and ammonia from various miscellaneous vents in the causticizing area. The sources tested include the causticizer/slaker, lime mud precoat filter, precoat filter vacuum pump exhaust, white liquor filter, and green liquor clarifier. All the data from these sources (except emissions of ammonia) came from the NCASI 16 mill MACT study and are reported in NCASI Technical Bulletin No. 676 (13). Thus, only range and averages are shown here as the individual mill data can be obtained from the NCASI report.

Table 17 presents emission data for 28 volatile organic compounds and terpenes from these miscellaneous causticizing area vents. The total hydrocarbon emissions were also measured using EPA Method 25A, and these data are included for each causticizing area vent in Table 17. The emission data for many of these 28 compounds are non-detect. The most prominent VOC emitted from the causticizing area vents was methanol.

As explained in Reference 13, the quality of the water used in the causticizing area contributes to the level of VOC emissions from these causticizing area vents. The temperature of the process operation and the vent gas flow rate also affect the level of VOC emissions.

Emissions of ammonia were measured from seven slaker and causticizer tank vents. The median emission of ammonia from the combined slaker/causticizer vents was about 0.46 lb/ton CaO, making it the single largest 'air toxic' emission from this source. Ammonia emissions from the other causticizing area vents were not available.

VIII PAPER MACHINES

Table 18 presents volatile organic compound emission data from four paper machines and one pulp dryer. These data are subdivided into three categories: unbleached linerboard machines (two), bleached pulp and paper machines (two) and semi-chemical corrugating medium machines (one).

Emissions for 28 different volatile organic compounds are presented in Table 18 for each of the three categories. Total hydrocarbons (THC) as measured by Method 25A and terpenes are also included for each category in Table 18. The most prominent VOC emitted from these paper machines was methanol, with a median emission rate of 1.21 lb/ADTFP for unbleached linerboard machines and 0.07 lb/ADTFP for bleached pulp and bleached paper machines. Note that all emissions are given in units of lb/air dried ton of finished product (ADTFP). The extent of the data was insufficient to determine whether the level of paper machine additives in the final product or the fraction of purchased pulp used to make the final product was instrumental in affecting the paper machine emissions. All five machines were tested during the NCASI MACT study, and detailed descriptions of the testing and process conditions are given in NCASI Technical Bulletin No. 681 (18).

The quality of the pulp and water slurry entering the paper mills, and the quality and degree of recirculation of the paper machine white water are expected to contribute to the level of volatile organic compound emissions from the paper machines. Paper machines making unbleached paper emit higher levels of VOCs than paper machines making bleached paper because unbleached pulp has had less washing stages before entering the paper mill than bleached pulp. The temperature and vent gas flow rates from the paper machine operation may also influence the level of VOC emissions from paper mills. VOC emissions from paper mills can be very mill-specific, depending on the type of pulps dried and the chemicals used in the papermaking process (sizing, defoamers, biocides, retention aids, felt cleaners, etc.). Furthermore, paper machines with indirect heat drying can have different emissions from those with direct heat drying. More data are needed before a better understanding can be obtained relative to what causes paper machine emissions to vary from one operation to another. NCASI is currently conducting extensive tests for 'air toxic' emissions from several non-integrated mill paper machines. These data should help in better understanding the factors influencing paper machine emissions.

IX WOOD-FIRED BOILERS

Table 19A reproduces all the VOC emission data that were included in NCASI Technical Bulletin No. 650 (2), except that instead of means or averages, medians (based on criteria described earlier in Section III) are calculated for each emission category. Emissions of 38 different VOCs from 20 boilers firing wood residue are presented in Table 19A. Also

presented are emissions of PAHs and THCs. Prominent VOCs emitted as a result of wood combustion include acetaldehyde, formaldehyde, methanol and naphthalene.

Table 19B presents all the trace metal emission data included earlier in Reference 2. Once again, medians rather than means are utilized. Emissions of 17 trace metals and the non-metal phosphorus from 17 wood residue-fired boilers are included.

X PREDICTION OF METHANOL EMISSIONS

The most prevalent organic or inorganic 'air toxic' compound emitted from each of the sources presented in this report is shown in Table 20. Methanol is the most prominent 'air toxic' VOC emitted from many of these sources, accounting in most cases for nearly 90 percent of the total 'air toxic' VOC emissions. In the NCASI MACT study (12-21) correlations for methanol emissions from various sources in pulp and paper mills were developed. These correlations were based on the levels of methanol concentration in the water used in each unit process. Although the number of sources tested was limited, these correlations were found to be quite good, with correlation coefficients (r^2) ranging from 0.86 to 0.99. These correlations can be used to obtain a first order estimate of methanol emissions from various unit processes in pulp and paper mills when combined with measurements for methanol concentrations in the appropriate mill process liquid. A summary of these correlations is presented below.

A. Oxygen Delignification

The controlling factor for total methanol emissions from O_2 delignification systems (blow tank vent, washers and interstage storage tank vents) appears to be the level of methanol in the post-oxygen delignification washer shower water. Mills use different water sources for this shower water, and methanol concentrations in this water can vary widely. This relationship of methanol emission from O_2 delignification as a function of the concentration of methanol in the shower water was expressed as:

$$Y = 0.000625 \cdot X + 0.322$$

where, Y = vent gas methanol emission rate, lb/ODTP (oven dry ton of pulp)
X = methanol concentration of last post-oxygen shower water, mg/L

and the correlation coefficient (r^2) was 0.99 (12). According to this correlation, if the last post-oxygen washer shower water contains no methanol, methanol emissions from the O_2 delignification system are predicted to be 0.32 lb/ODTP. Besides the methanol carried into the O_2 delignification reactor with the washed pulp, methanol may also be generated as a byproduct in O_2 delignification. Based on the median emission rate for ten O_2 delignification

systems of 0.98 lb methanol/ADTUBP reported in Table 4, this implies that these two sources of methanol, viz., generation and carryover with washed pulp, contribute, on average, up to one-third of the total methanol emissions from O_2 delignification system vents, with the rest attributable to shower water methanol content.

B. Smelt Dissolving Tank Vents

On average, more NH_3 is emitted from smelt dissolving tank vents than methanol. However, the most dominant hazardous air pollutant (HAP) emitted from smelt dissolving tank vents is methanol. The concentration of methanol in weak wash or fresh water used both to dissolve the smelt and scrub the particulate emissions from the smelt dissolving tank contributes to methanol emissions from smelt dissolving tank scrubber vents. The quality of the scrubber solution in mills varies considerably, and so does its methanol content. In the NCASI MACT study (13) methanol emissions from smelt dissolving tank vents correlated quite well with the concentration of methanol in four weak washes used in four smelt dissolving tanks. The following relationship was developed (13):

$$Y = 0.00578 \cdot X + 0.00064$$

where, Y = smelt dissolving tank methanol emissions, lb/TBLS
X = methanol concentration in weak wash, mg/L

The correlation coefficient (r^2) was 0.98 (13). If the above correlation were to be extrapolated to include smelt dissolving tanks using fresh mill water and clean condensates, then for the median methanol emission rate of 0.01 lb/TBLS in Table 15A for 26 smelt dissolving tanks, the solution used to dissolve the smelt and scrub the particulate matter emissions would contain on average about 1.6 mg/L of methanol. Alternately, a scrubbing solution with 100 mg/L methanol would result in methanol emissions of about 0.58 lb/TBLS.

C. Brownstock Washers

Methanol is the most dominant HAP emitted from brownstock washers, making up nearly 90 percent of the total HAP emissions. For a given type of washer, the controlling factor for methanol emissions from the brownstock washer system is the concentration of methanol in the final shower water used in brownstock washing. Mills use various sources for this shower water, and the methanol content can vary widely. Methanol emissions from vacuum drum brownstock washer systems correlated quite well with the level of methanol in the last stage shower water (15), the relationship being expressed as:

$$Y = 0.0011 \cdot X + 0.375$$

where, Y = brownstock washer system methanol emissions, lb/ODTP
X = final stage shower water methanol concentration, mg/L

The correlation coefficient (r^2) was 0.86 (15). Median methanol emissions from 30 vacuum drum units were given in Table 5 as 0.74 lb/ADTP. Thus, based on the above correlation, approximately half the methanol emissions can be attributed to the final stage shower water methanol content.

D. Paper Machines

Methanol is the major HAP emitted from paper machines at integrated mills, usually accounting for over 90 percent of the total VOC emissions. The methanol content of the water in the pulp coming from the pulp mill varies considerably from mill to mill. Because bleached pulps are washed more thoroughly than unbleached pulps, unbleached mills have higher methanol content in the water associated with the pulp than bleached mills. Methanol emissions from paper machine vents were found to be intimately related to the concentration of methanol in the paper mill white water (18). This was expressed as:

$$Y = 0.00477 \cdot X + 0.0953$$

where, Y = paper machine/pulp dryer methanol emissions, lb/ADT of finished product
X = methanol concentration in white water, mg/L

with the correlation coefficient (r^2) = 0.97 (18). Based on the median methanol emission rates in Table 18 of 1.2 lb/ADTFP for unbleached paper machines and 0.07 lb/ADTFB for bleached paper machines, the above correlation suggests that the white water methanol concentration is the overriding factor for unbleached paper machines and not so important a factor for bleached paper machines.

E. Summary

The above equations can be used to predict the methanol emissions from these unit processes with only a knowledge of the methanol concentration in the appropriate process liquid stream. When using these predictive equations, it should not be inferred that methanol in the water system is the only source of methanol emitted from the unit process. These equations merely represent a very simple approach for obtaining a rough estimate of methanol emissions. Additional data from other mills are needed to confirm the validity of these simple predictive equations.

XI EXAMPLE CALCULATIONS

Based on the emission data presented in this report, Table 21 provides an example calculation of annual emissions of three compounds from each source that may be expected to be emitted in the largest amounts. The sources in this table include pulping and recovery area sources, bleach plants and paper machines. For purposes of illustration, only those compounds were considered for which a reasonable number of measurements were made with appropriate test methods. Nominal source capacities, as shown, were used for these illustrative calculations. Table 21 shows that several volatile organic compounds such as methanol, acetone, and acetaldehyde and inorganic compounds such as ammonia and hydrochloric acid may be emitted at rates more than 1000 lb/yr from sources located in pulp and paper mills.

Table 22 provides similar example calculations of annual emissions for selected trace metal compounds. As seen from the table, these emissions are generally very low, all being under 350 lb/yr.

XII CAUTION IN THE USE OF EMISSION DATA

Before using this emission data compilation to estimate 'air toxic' emissions from pulp and paper mill sources, several precautions bear mentioning.

(1) For some 'air toxic' compounds, emissions were measured from only one unit process. In such cases, these data should be used with extreme caution. Limited data such as these need verification, especially when the single data point is used to represent all such unit processes.

(2) For many unit processes, emissions of some 'air toxic' compounds were always non-detect. Furthermore, the detection limits varied widely from mill to mill. One may be tempted to use one-half of the average of these detection limits. However, this may still give a higher than reasonable emission rate for the 'air toxic' compound.

(3) Statistical methods for treating emission data with varying degrees of censoring (i.e., non-detects) were used as described in Section III. The empirical median is the most reliable, as it uses all the relevant data. The NOR-PLOT median is the next most reliable, as it utilizes the information from three or more detected observations in a set. The SDln median is the least reliable. In cases where the non-detect data accounted for over 90 percent of the population, it should be remembered that the median emission is purely a statistically derived one and is to be used only because it is the most scientifically justifiable representative median.

(4) Several of the test methods have not been validated for pulp and paper mill sources. Emissions of several compounds obtained by the VOST and Semi-VOST methods need further verification such as by mass spectroscopy. The best test methods used for measurement of 'air toxics' in this report are (1) the NCASI/Weston heated canister with concentrator method with subsequent FID analysis and confirmation by mass spectroscopy and (2) the NCASI impinger method for methanol, acetone, MEK and acetaldehyde with direct injection GC analysis (or analysis of acetylacetone for formaldehyde).

(5) The best approach for using the emission data in this report is to select the emission source from the list of sources given that most closely represents the emission source of concern. The emission data from this representative source(s) may be used to give the expected emission range and average emission rate.

(6) In those cases where there is no clear representative source in the report for the source being estimated, the best approach is to use the median of the sources in the study, mindful of the previous precautionary notes given.

(7) Most of the data presented in this report constitute three one-hour runs. These data may not reflect the process variability inherent in long-term average emission rates.

XIII SUMMARY

Emission data and relevant process information pertaining to these emissions from several test programs during which emissions of various organic and inorganic 'air toxics' and total hydrocarbons were measured at chemical wood pulp and paper mills are compiled in this report. This report is an update to the 1993 NCASI Technical Bulletin No. 650 (2) which compiled 'air toxic' emission data for boilers, pulp mills and bleach plants. Two most recent studies (1993-1994), which covered emissions from sources in 26 mills (9,12-21), form the bulk of the new data presented in this report. Emissions from bleach plants, chemical pulp mill sources, recovery area sources, paper machines and wood-fired boilers are included. Pulp mill sources include brownstock washers, O_2 delignification systems, deckers, thermal oxidizers, pulp and black liquor storage tanks and uncontrolled NCGs. Recovery area sources include black liquor oxidation tanks, kraft recovery furnaces (DCE and NDCE), sulfite recovery furnaces, lime kilns, smelt dissolving tanks, tall oil reactors and causticizing area vents. Paper mill sources include unbleached and bleached paper/pulp and corrugating medium paper machines. Trace metal emissions from recovery furnaces (both kraft and sulfite), lime kilns, smelt dissolving tank vents and wood-fired boilers are also included in this report. This report contains the most recent and most comprehensive 'air toxic' emission data for chemical wood pulp and paper mills.

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TABLE 1 SUMMARY LIST OF SOURCES OF 'AIR TOXIC' EMISSION DATA

TABLE NO.	SOURCE DESCRIPTION	NO. OF SOURCES TESTED	'AIR TOXIC' COMPOUNDS	OTHER EMISSIONS	REFERENCES
3	Bleach Plant	52	organics*	Cl_2/ClO_2/ HCl/CO	3 to 10, 16
4	Oxygen Delignification	10	organics*	-	7,8,9,12
5	Brownstock Washer	37	organics*	H_2S	3,8,9,15
6	Uncontrolled Noncondensible Gases	19	organics**	H_2S	3,9,14
7	Black Liquor Tank	8	organics*	-	9,14
	Pulp Storage Tank	5	organics*	-	9,14
8	Decker	6	organics*	-	9,14
9	Thermal Oxidizer	5	organics*	-	9,14
10	Sulfite Pulp Mill Sources	2	organics*	-	19
11	Black Liquor Oxidation Tank	16	organics*	H_2S	3,8,9,17
12A	Kraft Recovery Furnace with DCE	21	organics*	HCl/PAHs/ H_2SO_4	3,4,8,9,17
12B	Kraft Recovery Furnace with DCE	13	trace metals	-	3,9
12C	NDCE Kraft Recovery Furnace	18	organics*	HCl/PAHs/ H_2SO_4	3,5,9,17

TABLE 1 (Cont'd) SUMMARY LIST OF SOURCES OF 'AIR TOXIC' EMISSION DATA

TABLE NO.	SOURCE DESCRIPTION	NO. OF SOURCES TESTED	'AIR TOXIC' COMPOUNDS	OTHER EMISSIONS	REFERENCES
12D	NDCE Kraft Recovery Furnace	10	trace metals	-	3,5,9
13A	Sulfite Recovery Furnace	5	organics*	HCl	9,19
13B	Sulfite Recovery Furnace	1	trace metals	-	9,19
14A	Lime Kiln	28	organics*	H_2S/PAHs	3,5,9,13
14B	Lime Kiln	13	trace metals	-	3,5,9
15A	Smelt Dissolving Tank	26	organics*	NH_3/H_2S	3,5,9,13
15B	Smelt Dissolving Tank	4	trace metals	-	3,5
16	Tall Oil Reactor	6	organics*	H_2S	3,9
17	Causticizing Area Sources	5	organics*	NH_3	9,13
18	Unbleached Paper Machine	3	organics*	-	18
	Bleached Paper Machine	2	organics*	-	18
19A	Wood Fired Boiler	20	organics**	HCl/PAHs	3,9,22,23
19B	Wood Fired Boiler	17	trace metals	-	9,22,23,24

*includes terpenes and total hydrocarbons
**includes terpenes for uncontrolled NCGs and total hydrocarbons for wood-fired boilers

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December 8, 1995

To: Recipients of NCASI Technical Bulletin No. 701
"Compilation of 'Air Toxic' and Total Hydrocarbon Emissions Data for Sources at Chemical Wood Pulp Mills"

From: Ronald A. Yeske

Subject: Correction and Addition to Previous Mailing

In October of this year you were mailed Technical Bulletin 701. Pages 34 and 35 in this document were in error, and part of Table 3 was omitted. Attached please find the corrected version of pages 33 - 36, which should replace these pages in the original version. We apologize for the oversight.

Also attached is a List of Tables in Technical Bulletin 701, which may enable readers to find specific data more easily.

Attachment

Street Address: **79 T.W. Alexander Drive, Building 4401, Suite 205**

TABLE 2A SUMMARY OF C_vS USING NOR-PLOT FOR SEVERAL SOURCES

SOURCE	C_v, COEFFICIENT OF VARIATION		
	Range	Median	No.
BLO Tank Vent	0.5 to 1.6E+10	10.9	13
Bleach Plant Vent	1.1 to 2.5E+04	5.1	20
Smelt Dissolving Tank Vent	1.2 to 59.1	17.0	5
Kraft Recovery Furnace, DCE	1.2 to 4.0E+17	10.8	14
Kraft Recovery Furnace, NDCE	1.0 to 11.6	3.0	9
Brownstock Washer Vent	0.7 to 3.4E+05	21.7	34
Deckers	1.0 to 8.7	3.3	7
Lime Kiln	3.9 to 17.9	7.1	6
O_2 Delignification Vent	0.7 to 103.4	1.6	11
NCG Thermal Oxidizer	2.0 to 4.2E+03	27.1	7
	Median (All Sources)	8.95	

TABLE 2B THEORETICAL RATIOS OF MEDIANS TO EXTREME VALUES FOR DIFFERENT C_vS

C_v	87TH PERCENTILE	92ND PERCENTILE	97TH PERCENTILE
0.5	0.587	0.516	0.414
1.0	0.392	0.311	0.211
2.0	0.240	0.169	0.100
4.0	0.150	0.094	0.043
8.0	0.100	0.057	0.022
16	0.070	0.037	0.012

TABLE 3 SUMMARY OF 'AIR TOXIC' EMISSIONS FROM KRAFT MILL BLEACH PLANTS

MILL CODE	TEST DATE	OXYGEN DELIG ?	CAPACITY ADTBP/DAY	WOOD TYPE	BLEACHING SEQUENCE	% ClO2 SUBST.	Cl/ClO2 SCRUBBER	NO. OF VENTS(i) TESTED	REFERENCE
BPA1(ii)	1991/1992	YES	650&800	SW	O(CD)(EO)D	50	YES	2 & 3	7 & 8
BPA2	1991	YES	725	HW	O(CD)(EO)D	15	YES	2	8
BPB	1991	NO	760	SW	(DC)(EO)HED	50	YES	8	8
BPC1a	1988(iii)	NO	700	MIXED	NA	0	NO	2	4
BPC1b	1990/1992	YES	720&728	MIXED	O(CD)(EO)HDED	25	NO	3	5 & 9
BPC2	1992	YES	728	SW	O(CD)(EO)HDED	22	NO	3	9
BPDa	1988	NO	700	NA	NA	NA	-	2	4
BPDb	1990	YES	720	NA	O(CD)(EO)DED	NA	YES	3	5
BPE	1990	NO	1934	HW/SW	(CD)(EP)DD	5&15	YES	1	9
BPF	1992	NO	1210	HW/SW	D(EPO)DEPD	100	YES	2	8
BPG	1991	NO	240	SW	C(EP)H(EP)DP	0	NO	1	6
BPH	1992	NO	991	HW/SW	(DC)(EO)D	70	YES	1	9
BPI	1992	NO	330	SW	CEH	0	NO	8	3
BPJ	1992	NO	440	SW	CEH	0	YES	7	3
BPK1	1992	NO	500	SW	(DC)(EO)HDH	70	YES	11	3
BPK2	1992	NO	300	HW	CEHDH	NA	YES	11	3
BPL1	1992	NO	725	HW	MEM(EP)D	50	YES	1	3
BPL2	1992	NO	600	SW	M(EO)D(EP)D	NA	YES	1(iv)	3
BPL3	1992	NO	300	SW	M(EO)DED	NA	YES	1	3
BPM	1992	NO	740	HW	(DC)D(EOP)D	50	YES	1	9
BPMA1	1994	YES	725	HW	O(DC)ED	MED to HIGH	YES	2	16
BPMA2	1994	YES	379	SW	O(DC)(EO)D(E+O)D	MED to HIGH	NO	7	16
BPMC1	1994	YES	616	HW	O(C+D)(EO)D	15	YES	3	16
BPMC2	1994	YES	662	SW	O(C+D)(EO)D	50	YES	3	16
BPME1	1994	NO	721	SW	DEDED	100	YES	18	16
BPME2	1994	NO	436	SW	(C+D)HEDED	30	YES	3	16
BPME3	1994	NO	448	HW	(C+D)HEDED	30	YES	3	16
BPMF1	1994	NO	749	HW	(D,C+D)(E,O+P)D	50	YES	3	16
BPMF2	1994	NO	762	SW	(D,C+D,C+D)(EO)DE	50	YES	9	16
BPMJ	1994	NO	410	SW	(D,C+D)(EOP)D	85	YES	2	16
BPMK	1994	YES	972	HW	O(D,C+D)(EO)DD	50	YES	4	16
BPML	1994	YES	1043	HW	O(D,C+D)(EO)D	50	YES	1	16
BPMM1	1994	NO	443	HW	(D,C+D)(E,O+P)D	60	YES	1	16
BPMM2	1994	NO	387	SW	(D,C+D)(E,O+P)DD	35	YES	3	16
BPMN	1994	YES	1307	SW	OD(EP)DD	100	YES	2	16
BPIA1	1993	NO	720	SW	(CD)(E,O+P)D	40	YES	1	9

TABLE 3 SUMMARY OF 'AIR TOXIC' EMISSIONS FROM KRAFT MILL BLEACH PLANTS, CONTD.

MILL CODE	TEST DATE	OXYGEN DELIG ?	CAPACITY ADTBP/DAY	WOOD TYPE	BLEACHING SEQUENCE	% ClO2 SUBST.	Cl/ClO2 SCRUBBER	NO. OF VENTS(i) TESTED	REFERENCE
BPIA2	1993	YES	644	HW	O(CD)(E,O+P)D	40	YES	2	9
BPIB	1993	NO	750	HW	C(EH)HD	0	YES	2	9
BPIC1	1993	YES	470	SW	OD(CD)(EOP)DD	50	YES	3	9
BPIC2	1993	YES	1500	SW	OD(CD)(EO)DED	40	YES	2	9
BPIC3	1993	YES	1500	SW	O(EO)(EO)DED	-	YES	2	9
BPIC4	1993	YES	1500	SW	ODD(EO)DED	100	YES	2	9
BPID	1993	NO	1164	HW/SW	D(CD)(EOP)(DP)	50, 30	YES	1	9
BPIE1	1993	NO	384	SW	(CD)(EOP)D	65	YES	3	9
BPIE2	1993	NO	470	HW	(CD)(EOP)D	65	YES	3	9
BPIF1	1993	NO	650	HW	(CD)ED(EP)D (SO2)	20	YES	10	9
BPIF2	1993	NO	730	HW/SW	(CD)(EH)D(EP)D(SO2	10	YES	11	9
BPIG	1993	NO	1500	HW/SW	D(CD)(EOPP)D[D]	50, 50	YES	1	9
BPIH1	1993	NO	750	SW	D(CD)(EOH)DE(DP)	55	YES	2	9
BPIH2	1993	NO	580	HW	D(CD)(EOH)DE(DP)	15	YES	2	9
BPII1	1993	YES	800	HW/SW	O(CD)(EOP)DED	25	YES	1	9
BPII2	1993	NO	450	HW	(CD)(EOP)DED	8	YES	1	9
BPIJ	1993	NO	650	HW	D(CD)(EO)DD	6	YES	1	9

Notes
(i) Emissions at each location correspond to the entire bleach plant , unless otherwise noted.
(ii) Mill BPA1 bleach plant was tested twice, once in 1991 and once in 1992.
(iii) Mill BPC1 bleach plant was tested once at 0% ClO2 substitution (BPC1a) and twice at 25% ClO2 substitution (BPC1b).
(iv) For this mill, gases from ClO2 generator area were also sent to the bleach plant scrubber.

Bleaching Notations : C - Chlorine; D - Chlorine Dioxide; E - Alkaline Extraction; P - Peroxide; O - O2 or O2 Delig; H - Hypochlorite; M - Monox-L; SO2 - SO2;

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TABLE 3 SUMMARY OF 'AIR TOXIC' EMISSIONS FROM KRAFT MILL BLEACH PLANTS, CONTD.

		EMISSIONS				
VOLATILE ORGANIC COMPOUND	MILL CODE	RANGE lb/ADTBP	AVG lb/ADTBP	TEST METHOD	COMMENTS
ACETALDEHYDE	BPC1b	0.013-1.16 mg/m3	8.1E-04	CARB 430	
ACETALDEHYDE	BPDb	0.025-8.59 mg/m3	1.6E-02	CARB 430	
ACETALDEHYDE	BPG	0.0011 to 0.0021	1.5E-03	RTI DRAFT	
ACETALDEHYDE	BPMA1		9.8E-03	IMPINGER	does not include DC & E tower vents
ACETALDEHYDE	BPMA2		1.0E-02	IMPINGER	does not include DC tower vent
ACETALDEHYDE	BPMC1		2.6E-03	IMPINGER	NCASI METHOD
ACETALDEHYDE	BPMC2		1.2E-03	IMPINGER	NCASI METHOD
ACETALDEHYDE	BPME1		ND[5.9E-03]	IMPINGER	NCASI METHOD
ACETALDEHYDE	BPME2		ND[5.3E-03]	IMPINGER	NCASI METHOD
ACETALDEHYDE	BPME3		ND[6.0E-03]	IMPINGER	NCASI METHOD
ACETALDEHYDE	BPMF1		8.5E-04	IMPINGER/CANISTER	NCASI METHOD/FID
ACETALDEHYDE	BPMF2		5.9E-04	HEATED CANISTER	FID
ACETALDEHYDE	BPMJ		2.4E-03	HEATED CANISTER	scrubber inlet tested, not outlet
ACETALDEHYDE	BPMK		3.0E-03	HEATED CANISTER	FID
ACETALDEHYDE	BPML		1.7E-03	HEATED CANISTER	<2.1E-3 lb/ADBTP by impinger method
ACETALDEHYDE	BPMM1		8.8E-04	HEATED CANISTER	FID
ACETALDEHYDE	BPMM2		3.1E-02	HEATED CANISTER	FID
ACETALDEHYDE	BPMN		3.6E-03	HEATED CANISTER	FID
ACETALDEHYDE	BPIA1		ND[6.5E-03]	HEATED CANISTER	FID, 2.8E-03 by DNPH
ACETALDEHYDE	BPIA2	0.0076 to 0.0077	7.7E-03	HEATED CANISTER	FID, 7.7E-03 by DNPH
ACETALDEHYDE	BPIB	0.0086 to 0.010	9.5E-03	HEATED CANISTER	FID, 1.3E-02 by DNPH
ACETALDEHYDE	BPIC1	ND to 0.002	7.8E-04	IMPINGER	DNPH
ACETALDEHYDE	BPIC2	5.4E-04	5.4E-04	IMPINGER	DNPH
ACETALDEHYDE	BPIC3	1.2E-03	1.2E-03	IMPINGER	DNPH
ACETALDEHYDE	BPID	0.001 to 0.002	1.5E-03	IMPINGER	DNPH
ACETALDEHYDE	BPIE1	ND to 0.00015	1.0E-04	IMPINGER	DNPH
ACETALDEHYDE	BPIE2	ND to 0.00015	1.0E-04	IMPINGER	DNPH
ACETALDEHYDE	BPIF1	0.0010 to 0.0011	1.0E-03	IMPINGER	DNPH
ACETALDEHYDE	BPIF2	.00024 to .00026	2.5E-04	IMPINGER	DNPH
ACETALDEHYDE	BPIG		ND[2.0E-04]	IMPINGER	DNPH
ACETALDEHYDE	BPIH1		ND[8.2E-03]	HEATED CANISTER	FID, 1.1E-03 by DNPH
ACETALDEHYDE	BPIH2		ND[8.2E-03]	HEATED CANISTER	FID, 3.7E-04 by DNPH
ACETALDEHYDE	BPIJ		ND[2.4E-03]	HEATED CANISTER	FID, 2.0E-03 by DNPH
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
33	25		ND to 3.1E-02	8.8E-04		
ACETONE		BPA1	0.0022 to 0.007	4.9E-03	NCASI & M0011	
ACETONE		BPA2	0.081 to 0.085	8.3E-02	IMPINGER	NCASI METHOD
ACETONE		BPB		ND[0.01]	IMPINGER	NCASI METHOD
ACETONE		BPE	1.8E-4 to 1.7E-3	1.0E-03	MOD NIOSH 2000	
ACETONE		BPF	0.008 to 0.01	9.0E-03	IMPINGER	NCASI METHOD
ACETONE		BPG	0.0014 to 0.0078	3.2E-03	VOST	
ACETONE		BPH	0.0001 to 0.0002	1.6E-04	IMPINGER	NCASI METHOD
ACETONE		BPI	0.0033 to 0.0074	6.5E-03	M18	
ACETONE		BPJ		ND[0.009]	M18	
ACETONE		BPK1	0.0011 to 0.0013	1.2E-03	M18	
ACETONE		BPK2	0.002 to 0.039	1.6E-02	M18	
ACETONE		BPL1		ND[3.0E-03]	M18	
ACETONE		BPL2	ND to 0.160	5.6E-02	M18	
ACETONE		BPL3		ND[8.0E-03]	M18	
ACETONE		BPMA1		5.9E-03	HEATED CANISTER	does not include DC & E tower vents
ACETONE		BPMA2		6.0E-03	HEATED CANISTER	does not include DC tower vent
ACETONE		BPMC1		6.4E-03	HEATED CANISTER	FID
ACETONE		BPMC2		1.2E-02	HEATED CANISTER	FID
ACETONE		BPME1		1.9E-03	HEATED CANISTER	FID
ACETONE		BPME2		9.8E-04	HEATED CANISTER	FID
ACETONE		BPME3		2.2E-04	HEATED CANISTER	FID
ACETONE		BPMF1		3.5E-03	HEATED CANISTER	FID
ACETONE		BPMF2		9.3E-03	HEATED CANISTER	FID
ACETONE		BPMJ		3.7E-03	HEATED CANISTER	FID
ACETONE		BPMK		3.1E-03	HEATED CANISTER	FID
ACETONE		BPML		1.3E-03	HEATED CANISTER	FID

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BOOK 2

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TABLE 2A SUMMARY OF C_vS USING NOR-PLOT FOR SEVERAL SOURCES

SOURCE	C_v, COEFFICIENT OF VARIATION		
	Range	Median	No.
BLO Tank Vent	0.5 to 1.6E+10	10.9	13
Bleach Plant Vent	1.1 to 2.5E+04	5.1	20
Smelt Dissolving Tank Vent	1.2 to 59.1	17.0	5
Kraft Recovery Furnace, DCE	1.2 to 4.0E+17	10.8	14
Kraft Recovery Furnace, NDCE	1.0 to 11.6	3.0	9
Brownstock Washer Vent	0.7 to 3.4E+05	21.7	34
Deckers	1.0 to 8.7	3.3	7
Lime Kiln	3.9 to 17.9	7.1	6
O_2 Delignification Vent	0.7 to 103.4	1.6	11
NCG Thermal Oxidizer	2.0 to 4.2E+03	27.1	7
	Median (All Sources)	8.95	

TABLE 2B THEORETICAL RATIOS OF MEDIANS TO EXTREME VALUES FOR DIFFERENT C_vS

C_v	87TH PERCENTILE	92ND PERCENTILE	97TH PERCENTILE
0.5	0.587	0.516	0.414
1.0	0.392	0.311	0.211
2.0	0.240	0.169	0.100
4.0	0.150	0.094	0.043
8.0	0.100	0.057	0.022
16	0.070	0.037	0.012

TABLE 2A SUMMARY OF C_vS USING NOR-PLOT FOR SEVERAL SOURCES

SOURCE	C_v, COEFFICIENT OF VARIATION		
	Range	Median	No.
BLO Tank Vent	**0.5 to 1.6E+10**	**10.9**	13
Bleach Plant Vent	**1.1 to 2.5E+04**	**5.1**	20
Smelt Dissolving Tank Vent	1.2 to 59.1	17.0	5
Kraft Recovery Furnace, DCE	1.2 to 4.0E+17	10.8	14
Kraft Recovery Furnace, NDCE	1.0 to 11.6	3.0	9
Brownstock Washer Vent	0.7 to 3.4E+05	21.7	34
Deckers	1.0 to 8.7	3.3	7
Lime Kiln	3.9 to 17.9	7.1	6
O_2 Delignification Vent	0.7 to 103.4	1.6	11
NCG Thermal Oxidizer	2.0 to 4.2E+03	27.1	7
	Median (All Sources)	**8.95**	

TABLE 2B THEORETICAL RATIOS OF MEDIANS TO EXTREME VALUES FOR DIFFERENT C_vS

C_v	87TH PERCENTILE	92ND PERCENTILE	97TH PERCENTILE
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2.0	0.240	0.169	0.100
4.0	0.150	0.094	0.043
8.0	0.100	0.057	0.022
16	0.070	0.037	0.012

TABLE 3 SUMMARY OF 'AIR TOXIC' EMISSIONS FROM KRAFT MILL BLEACH PLANTS

MILL CODE	TEST DATE	OXYGEN DELIG ?	CAPACITY ADTBP/DAY	WOOD TYPE	BLEACHING SEQUENCE	% ClO2 SUBST.	Cl/ClO2 SCRUBBER	NO. OF VENTS(i) TESTED	REFERENCE
BPA1(ii)	1991/1992	YES	650&800	SW	O(CD)(EO)D	50	YES	2 & 3	7 & 8
BPA2	1991	YES	725	HW	O(CD)(EO)D	15	YES	2	8
BPB	1991	NO	760	SW	(DC)(EO)HED	50	YES	8	8
BPC1a	1988(iii)	NO	700	MIXED	NA	0	NO	2	4
BPC1b	1990/1992	YES	720&728	MIXED	O(CD)(EO)HDED	25	NO	3	5 & 9
BPC2	1992	YES	728	SW	O(CD)(EO)HDED	22	NO	3	9
BPDa	1988	NO	700	NA	NA	NA	-	2	4
BPDb	1990	YES	720	NA	O(CD)(EO)DED	NA	YES	3	5
BPE	1990	NO	1934	HW/SW	(CD)(EP)DD	5&15	YES	1	9
BPF	1992	NO	1210	HW/SW	D(EPO)DEPD	100	YES	2	8
BPG	1991	NO	240	SW	C(EP)H(EP)DP	0	NO	1	6
BPH	1992	NO	991	HW/SW	(DC)(EO)D	70	YES	1	9
BPI	1992	NO	330	SW	CEH	0	NO	8	3
BPJ	1992	NO	440	SW	CEH	0	YES	7	3
BPK1	1992	NO	500	SW	(DC)(EO)HDH	70	YES	11	3
BPK2	1992	NO	300	HW	CEHDH	NA	YES	11	3
BPL1	1992	NO	725	HW	MEM(EP)D	50	YES	1	3
BPL2	1992	NO	600	SW	M(EO)D(EP)D	NA	YES	1(iv)	3
BPL3	1992	NO	300	SW	M(EO)DED	NA	YES	1	3
BPM	1992	NO	740	HW	(DC)D(EOP)D	50	YES	1	9
BPMA1	1994	YES	725	HW	O(DC)ED	MED to HIGH	YES	2	16
BPMA2	1994	YES	379	SW	O(DC)(EO)D(E+O)D	MED to HIGH	NO	7	16
BPMC1	1994	YES	616	HW	O(C+D)(EO)D	15	YES	3	16
BPMC2	1994	YES	662	SW	O(C+D)(EO)D	50	YES	3	16
BPME1	1994	NO	721	SW	DEDED	100	YES	18	16
BPME2	1994	NO	436	SW	(C+D)HEDED	30	YES	3	16
BPME3	1994	NO	448	HW	(C+D)HEDED	30	YES	3	16
BPMF1	1994	NO	749	HW	(D,C+D)(E,O+P)D	50	YES	3	16
BPMF2	1994	NO	762	SW	(D,C+D,C+D)(EO)DED	50	YES	9	16
BPMJ	1994	NO	410	SW	(D,C+D)(EOP)D	85	YES	2	16
BPMK	1994	YES	972	HW	O(D,C+D)(EO)DD	50	YES	4	16
BPML	1994	YES	1043	HW	O(D,C+D)(EO)D	50	YES	1	16
BPMM1	1994	NO	443	HW	(D,C+D)(E,O+P)D	60	YES	1	16
BPMM2	1994	NO	387	SW	(D,C+D)(E,O+P)DD	35	YES	3	16
BPMN	1994	YES	1307	SW	OD(EP)DD	100	YES	2	16
BPIA1	1993	NO	720	SW	(CD)(E,O+P)D	40	YES	1	9

TABLE 3 SUMMARY OF 'AIR TOXIC' EMISSIONS FROM KRAFT MILL BLEACH PLANTS, CONTD.

VOLATILE ORGANIC COMPOUND		MILL CODE	EMISSIONS RANGE lb/ADTBP	EMISSIONS AVG lb/ADTBP	TEST METHOD	COMMENTS
ACETALDEHYDE		BPC1b	0.013-1.16 mg/m3	8.1E-04	CARB 430	
ACETALDEHYDE		BPDb	0.025-8.59 mg/m3	1.8E-02	CARB 430	
ACETALDEHYDE		BPG	0.0011 to 0.0021	1.5E-03	RTI DRAFT	
ACETALDEHYDE		BPMA1		9.8E-03	IMPINGER	does not include DC & E tower vents
ACETALDEHYDE		BPMA2		1.0E-02	IMPINGER	does not include DC tower vent
ACETALDEHYDE		BPMC1		2.8E-03	IMPINGER	NCASI METHOD
ACETALDEHYDE		BPMC2		1.2E-03	IMPINGER	NCASI METHOD
ACETALDEHYDE		BPME1		ND[5.9E-03]	IMPINGER	NCASI METHOD
ACETALDEHYDE		BPME2		ND[5.3E-03]	IMPINGER	NCASI METHOD
ACETALDEHYDE		BPME3		ND[6.0E-03]	IMPINGER	NCASI METHOD
ACETALDEHYDE		BPMF1		8.5E-04	IMPINGER/CANISTER	NCASI METHOD/FID
ACETALDEHYDE		BPMF2		5.9E-04	HEATED CANISTER	FID
ACETALDEHYDE		BPMJ		2.4E-03	HEATED CANISTER	scrubber inlet tested, not outlet
ACETALDEHYDE		BPMK		3.0E-03	HEATED CANISTER	FID
ACETALDEHYDE		BPML		1.7E-03	HEATED CANISTER	<2.1E-3 lb/ADBTP by impinger method
ACETALDEHYDE		BPMM1		8.8E-04	HEATED CANISTER	FID
ACETALDEHYDE		BPMM2		3.1E-02	HEATED CANISTER	FID
ACETALDEHYDE		BPMN		3.6E-03	HEATED CANISTER	FID
ACETALDEHYDE		BPIA1		ND[8.5E-03]	HEATED CANISTER	FID, 2.8E-03 by DNPH
ACETALDEHYDE		BPIA2	0.0076 to 0.0077	7.7E-03	HEATED CANISTER	FID, 7.7E-03 by DNPH
ACETALDEHYDE		BPIB	0.0086 to 0.010	9.5E-03	HEATED CANISTER	FID, 1.3E-02 by DNPH
ACETALDEHYDE		BPIC1	ND to 0.002	7.8E-04	IMPINGER	DNPH
ACETALDEHYDE		BPIC2	5.4E-04	5.4E-04	IMPINGER	DNPH
ACETALDEHYDE		BPIC3	1.2E-03	1.2E-03	IMPINGER	DNPH
ACETALDEHYDE		BPID	0.001 to 0.002	1.5E-03	IMPINGER	DNPH
ACETALDEHYDE		BPIE1	ND to 0.00015	1.0E-04	IMPINGER	DNPH
ACETALDEHYDE		BPIE2	ND to 0.00015	1.0E-04	IMPINGER	DNPH
ACETALDEHYDE		BPIF1	0.0010 to 0.0011	1.0E-03	IMPINGER	DNPH
ACETALDEHYDE		BPIF2	.00024 to .00026	2.5E-04	IMPINGER	DNPH
ACETALDEHYDE		BPIG		ND[2.0E-04]	IMPINGER	DNPH
ACETALDEHYDE		BPIH1		ND[8.2E-03]	HEATED CANISTER	FID, 1.1E-03 by DNPH
ACETALDEHYDE		BPIH2		ND[8.2E-03]	HEATED CANISTER	FID, 3.7E-04 by DNPH
ACETALDEHYDE		BPIJ		ND[2.4E-03]	HEATED CANISTER	FID, 2.0E-03 by DNPH
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
33	25		ND to 3.1E-02	8.8E-04		
ACETONE		BPA1	0.0022 to 0.007	4.9E-03	NCASI & M0011	
ACETONE		BPA2	0.081 to 0.085	8.3E-02	IMPINGER	NCASI METHOD
ACETONE		BPB		ND[0.01]	IMPINGER	NCASI METHOD
ACETONE		BPE	1.6E-4 to 1.7E-3	1.0E-03	MOD NIOSH 2000	
ACETONE		BPF	0.008 to 0.01	9.0E-03	IMPINGER	NCASI METHOD
ACETONE		BPG	0.0014 to 0.0078	3.2E-03	VOST	
ACETONE		BPH	0.0001 to 0.0002	1.6E-04	IMPINGER	NCASI METHOD
ACETONE		BPI	0.0033 to 0.0074	6.5E-03	M18	
ACETONE		BPJ		ND[0.009]	M18	
ACETONE		BPK1	0.0011 to 0.0013	1.2E-03	M18	
ACETONE		BPK2	0.002 to 0.039	1.6E-02	M18	
ACETONE		BPL1		ND[3.0E-03]	M18	
ACETONE		BPL2	ND to 0.16C	5.6E-02	M18	
ACETONE		BPL3		ND[8.0E-03]	M18	
ACETONE		BPMA1		5.9E-03	HEATED CANISTER	does not include DC & E tower vents
ACETONE		BPMA2		6.0E-03	HEATED CANISTER	does not include DC tower vent
ACETONE		BPMC1		6.4E-03	HEATED CANISTER	FID
ACETONE		BPMC2		1.2E-02	HEATED CANISTER	FID
ACETONE		BPME1		1.9E-03	HEATED CANISTER	FID
ACETONE		BPME2		9.8E-04	HEATED CANISTER	FID
ACETONE		BPME3		2.2E-04	HEATED CANISTER	FID
ACETONE		BPMF1		3.5E-03	HEATED CANISTER	FID
ACETONE		BPMF2		9.3E-03	HEATED CANISTER	FID
ACETONE		BPMJ		3.7E-03	HEATED CANISTER	FID
ACETONE		BPMK		3.1E-03	HEATED CANISTER	FID
ACETONE		BPML		1.3E-03	HEATED CANISTER	FID

TABLE 3 SUMMARY OF 'AIR TOXIC' EMISSIONS FROM KRAFT MILL BLEACH PLANTS, CONTD.

VOLATILE ORGANIC COMPOUND		MILL CODE	EMISSIONS RANGE lb/ADTBP	EMISSIONS AVG lb/ADTBP	TEST METHOD	COMMENTS
ACETONE		BPMM1		6.0E-04	HEATED CANISTER	FID
ACETONE		BPMM2		1.2E-02	HEATED CANISTER	FID
ACETONE		BPMN		2.6E-03	HEATED CANISTER	FID
ACETONE		BPIA1	ND to 0.013	7.3E-03	HEATED CANISTER	FID, 2.8E-03 by DNPH
ACETONE		BPIA2	0.010 to 0.011	1.0E-02	HEATED CANISTER	FID, 4.4E-03 by DNPH
ACETONE		BPIB	0.013 to 0.016	1.4E-02	HEATED CANISTER	FID, 1.7E-02 by DNPH
ACETONE		BPIC1	ND to 0.015	4.2E-03	HEATED CANISTER	FID
ACETONE		BPIC2	4.3E-03	4.3E-03	IMPINGER	DNPH
ACETONE		BPIC3	3.8E-03	3.8E-03	IMPINGER	DNPH
ACETONE		BPID	ND to 0.003	2.2E-03	HEATED CANISTER	FID, 3.6E-03 by DNPH
ACETONE		BPIE1	0.010 to 0.018	1.4E-02	HEATED CANISTER	FID, 8.0E-03 by DNPH
ACETONE		BPIE2	0.011 to 0.025	1.7E-02	HEATED CANISTER	FID, 8.0E-03 by DNPH
ACETONE		BPIF1	0.0005 to 0.0047	2.2E-03	HEATED CANISTER	FID, 1.2E-02 by DNPH
ACETONE		BPIF2	0.0005 to 0.0047	2.2E-03	HEATED CANISTER	FID, 4.7E-03 by DNPH
ACETONE		BPIG	ND to 0.0003	1.8E-04	IMPINGER	DNPH
ACETONE		BPIH1		ND[1.1E-02]	HEATED CANISTER	FID, 1.1E-03 by DNPH
ACETONE		BPIH2		ND[8.4E-03]	HEATED CANISTER	FID, 9.1E-04 by DNPH
ACETONE		BPII1		ND[4.9E-03]	HEATED CANISTER	FID
ACETONE		BPII2		ND[9.2E-03]	HEATED CANISTER	FID
ACETONE		BPIJ		ND[3.3E-03]	HEATED CANISTER	FID, 5.0E-03 by DNPH
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
46	37		ND to 1.6E-01	3.1E-03		
ACETOPHENONE		BPA2		ND[3.6E-05]	M0010	
ACETOPHENONE		BPIA1		ND[1.8E-02]	HEATED CANISTER	FID, ND[1.1E-04] by DNPH
ACETOPHENONE		BPIA2		ND[4.1E-02]	HEATED CANISTER	FID, ND[6.3E-04] by DNPH
ACETOPHENONE		BPIB		ND[2.0E-02]	HEATED CANISTER	FID, ND[1.5E-03] by DNPH
ACETOPHENONE		BPIC1		ND[1.1E-02]	HEATED CANISTER	FID, ND[2.0E-03] by DNPH
ACETOPHENONE		BPID		ND[6.9E-03]	HEATED CANISTER	FID, ND[4.2E-04] by DNPH
ACETOPHENONE		BPIE1		ND[1.5E-02]	HEATED CANISTER	FID, ND[4.0E-04] by DNPH
ACETOPHENONE		BPIE2		ND[1.6E-02]	HEATED CANISTER	FID, ND[4.0E-04] by DNPH
ACETOPHENONE		BPIF1		ND[3.4E-02]	HEATED CANISTER	FID, ND[1.4E-04] by DNPH
ACETOPHENONE		BPIF2		ND[2.1E-02]	HEATED CANISTER	FID, ND[5.0E-05] by DNPH
ACETOPHENONE		BPIG		ND[7.5E-03]	HEATED CANISTER	FID, ND[3.2E-04] by DNPH
ACETOPHENONE		BPIH1		ND[2.2E-02]	HEATED CANISTER	FID, ND[4.2E-04] by DNPH
ACETOPHENONE		BPIH2		ND[1.7E-02]	HEATED CANISTER	FID, ND[1.1E-04] by DNPH
ACETOPHENONE		BPII1		ND[9.4E-03]	HEATED CANISTER	FID
ACETOPHENONE		BPII2		ND[1.9E-02]	HEATED CANISTER	FID
ACETOPHENONE		BPIJ		ND[6.7E-03]	HEATED CANISTER	FID, ND[7.4E-05] by DNPH
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
16	0		ND	ND		
ACROLEIN		BPA1		ND [1.2E-5]	MOO11	
ACROLEIN		BPG	1.7E-5 to 3.0E-5	2.5E-05	RTI DRAFT	
ACROLEIN		BPMC1		ND[3.3E-04]	IMPINGER	NCASI METHOD
ACROLEIN		BPMF1		1.0E-04	HEATED CANISTER	FID
ACROLEIN		BPMF2		ND[4.5E-04]	HEATED CANISTER	FID
ACROLEIN		BPMJ		2.7E-05	HEATED CANISTER	FID
ACROLEIN		BPMK		1.2E-04	HEATED CANISTER	FID
ACROLEIN		BPML		ND[9.6E-05]	HEATED CANISTER	FID
ACROLEIN		BPMM1		ND[2.5E-05]	HEATED CANISTER	FID
ACROLEIN		BPMM2		1.7E-03	HEATED CANISTER	FID, U
ACROLEIN		BPMN		1.7E-04	HEATED CANISTER	FID, U
ACROLEIN		BPIA1		ND[8.3E-03]	HEATED CANISTER	FID, ND[2.1E-04] by DNPH
ACROLEIN		BPIA2		ND[1.9E-02]	HEATED CANISTER	FID, ND[2.2E-04] by DNPH
ACROLEIN		BPIB		ND[9.3E-03]	HEATED CANISTER	FID, ND[1.4E-03] by DNPH
ACROLEIN		BPIC1		ND[9.5E-04]	IMPINGER	DNPH
ACROLEIN		BPID		ND[3.2E-03]	HEATED CANISTER	FID, ND[2.1E-04] by DNPH
ACROLEIN		BPIE1		ND[1.9E-04]	IMPINGER	DNPH
ACROLEIN		BPIE2		ND[1.9E-04]	IMPINGER	DNPH

TABLE 3 SUMMARY OF 'AIR TOXIC' EMISSIONS FROM KRAFT MILL BLEACH PLANTS, CONTD.

			EMISSIONS			
VOLATILE ORGANIC		MILL	RANGE	AVG	TEST	
COMPOUND		CODE	lb/ADTBP	lb/ADTBP	METHOD	COMMENTS
ACROLEIN		BPIG		ND[2.1E-04]	IMPINGER	DNPH
ACROLEIN		BPIH1		ND[1.0E-02]	HEATED CANISTER	FID, ND[3.2E-04] by DNPH
ACROLEIN		BPIH2		ND[8.2E-03]	HEATED CANISTER	FID, ND[2.1E-04] by DNPH
ACROLEIN		BPII1		ND[4.4E-03]	HEATED CANISTER	FID
ACROLEIN		BPII2		ND[8.9E-03]	HEATED CANISTER	FID
ACROLEIN		BPIJ		ND[3.2E-03]	HEATED CANISTER	FID, ND[1.1E-04] by DNPH
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
24	7		ND to 1.7E-03	2.0E-06		
ACRYLONITRILE		BPG		ND[1.3E-04]	VOST	
ANILINE		BPA2		ND[3.7E-06]	M0010	
BENZALDEHYDE		BPIA1	0.0021 to 0.0037	2.9E-03		FID
BENZALDEHYDE		BPIA2		ND[5.5E-04]		FID
BENZALDEHYDE		BPIB	ND to 0.0018	1.1E-03		FID
BENZALDEHYDE		BPIC1		ND[1.8E-03]		FID
BENZALDEHYDE		BPID		ND[4.2E-04]		FID
BENZALDEHYDE		BPIE1		ND[3.6E-04]		FID
BENZALDEHYDE		BPIE2		ND[3.6E-04]		FID
BENZALDEHYDE		BPIF1	0.0005 to 0.0011	7.9E-04		FID
BENZALDEHYDE		BPIF2	ND to 0.0005	2.8E-04		FID
BENZALDEHYDE		BPIG		ND[3.2E-04]		FID
BENZALDEHYDE		BPIH1		ND[3.2E-04]		FID
BENZALDEHYDE		BPIH2		ND[2.1E-04]		FID
BENZALDEHYDE		BPIJ		ND[7.4E-05]		FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
13	4		ND to 3.7E-03	1.1E-04		
BENZENE		BPC1a	<5.4 to 6 ug/m3	4.8E-06	VOST	
BENZENE		BPDa		ND[2.5E-05]	VOST	
BENZENE		BPDb		ND[2.1E-04]	CARB 422	
BENZENE		BPG	-	9.7E-05	VOST	
BENZENE		BPI		ND [0.0054]	M18	
BENZENE		BPJ		ND [0.0056]	M18	
BENZENE		BPK1		ND [0.004]	M18	
BENZENE		BPK2	ND to 0.0025	2.1E-03	M18	
BENZENE		BPL1		ND [0.0032]	M18	
BENZENE		BPL2		ND[0.004]	M18	
BENZENE		BPL3		ND[0.008]	M18	
BENZENE		BPMA1		ND[1.8E-04]	HEATED CANISTER	does not include DC & E tower vents
BENZENE		BPMA2		6.3E-05	HEATED CANISTER	does not include DC tower vent
BENZENE		BPMC1		4.2E-04	HEATED CANISTER	FID
BENZENE		BPMC2		1.3E-04	HEATED CANISTER	FID
BENZENE		BPME1		1.8E-04	HEATED CANISTER	FID
BENZENE		BPME2		1.0E-04	HEATED CANISTER	FID
BENZENE		BPME3		ND[2.2E-04]	HEATED CANISTER	FID
BENZENE		BPMF1		6.0E-05	HEATED CANISTER	FID
BENZENE		BPMF2		7.9E-04	HEATED CANISTER	FID
BENZENE		BPMJ		2.4E-05	HEATED CANISTER	FID
BENZENE		BPMK		ND[3.8E-05]	HEATED CANISTER	FID
BENZENE		BPML		ND[5.2E-05]	HEATED CANISTER	FID
BENZENE		BPMM1		ND[1.4E-05]	HEATED CANISTER	FID
BENZENE		BPMM2		ND[3.3E-04]	HEATED CANISTER	FID
BENZENE		BPMN		7.9E-05	HEATED CANISTER	FID
BENZENE		BPIA1		ND[1.2E-02]	HEATED CANISTER	FID
BENZENE		BPIA2		ND[2.7E-02]	HEATED CANISTER	FID
BENZENE		BPIB		ND[1.3E-02]	HEATED CANISTER	FID

TABLE 3 SUMMARY OF 'AIR TOXIC' EMISSIONS FROM KRAFT MILL BLEACH PLANTS, CONTD.

			EMISSIONS			
VOLATILE ORGANIC		MILL	RANGE	AVG	TEST	
COMPOUND		CODE	lb/ADTBP	lb/ADTBP	METHOD	COMMENTS
BENZENE		BPIC1		ND[1.3E-02]	HEATED CANISTER	FID
BENZENE		BPID		ND[4.5E-03]	HEATED CANISTER	FID
BENZENE		BPIE1	ND to 0.010	5.2E-03	HEATED CANISTER	FID
BENZENE		BPIE2	ND to 0.011	5.5E-03	HEATED CANISTER	FID
BENZENE		BPIF1	ND to 0.023	1.2E-02	HEATED CANISTER	FID
BENZENE		BPIF2	ND to 0.014	7.1E-03	HEATED CANISTER	FID
BENZENE		BPIG		ND[4.9E-03]	HEATED CANISTER	FID
BENZENE		BPIH1		ND[1.5E-02]	HEATED CANISTER	FID
BENZENE		BPIH2		ND[1.1E-02]	HEATED CANISTER	FID
BENZENE		BPII1		ND[6.0E-03]	HEATED CANISTER	FID
BENZENE		BPII2		ND[1.2E-02]	HEATED CANISTER	FID
BENZENE		BPIJ		ND[4.4E-03]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN*		
41	16		ND to 2.3E-02	6.2E-06		
BROMODICHLOROMETHANE		BPG	0.0023 to 0.0078	5.1E-03	VOST	
BROMODICHLOROMETHANE		BPI		ND [0.0054]	M18	
BROMODICHLOROMETHANE		BPJ		ND [0.0056]	M18	
BROMODICHLOROMETHANE		BPK1		ND [0.0044]	M18	
BROMODICHLOROMETHANE		BPK2	0.0035 to 0.0039	3.7E-03	M18	
BROMODICHLOROMETHANE		BPL1		ND[0.0032]	M18	
BROMODICHLOROMETHANE		BPL2		ND[0.004]	M18	
BROMODICHLOROMETHANE		BPL3	ND to 0.013	8.5E-03	M18	
NO. OF TESTS	DETECTS		RANGE	MEDIAN*		
8	3		ND to 1.3E-02	2.5E-03		
BROMOMETHANE		BPG		ND[6.4E-04]	VOST	
CARBON DISULFIDE		BPG		ND[2.8E-04]	VOST	
CARBON TETRACHLORIDE		BPC1a	2.9 to 28 ug/m3	1.5E-05	VOST	
CARBON TETRACHLORIDE		BPC1b	<24-614 ug/m3	8.7E-04	CARB 422	
CARBON TETRACHLORIDE		BPDa	4.1 to 7.1 ug/m3	5.5E-05	VOST	
CARBON TETRACHLORIDE		BPDb		ND[4.2E-04]	CARB 422	
CARBON TETRACHLORIDE		BPG	7.9E-7 to 2.1E-3	6.5E-04	VOST	
CARBON TETRACHLORIDE		BPL1		ND[3.0E-03]	M18	
CARBON TETRACHLORIDE		BPL2		ND[4.0E-03]	M18	
CARBON TETRACHLORIDE		BPL3		ND[8.0E-03]	M18	
CARBON TETRACHLORIDE		BPMA1		ND[3.7E-03]	HEATED CANISTER	does not include DC & E tower vents
CARBON TETRACHLORIDE		BPMA2		ND[1.6E-03]	HEATED CANISTER	does not include DC tower vent
CARBON TETRACHLORIDE		BPMC1		ND[2.4E-03]	HEATED CANISTER	FID
CARBON TETRACHLORIDE		BPMC2		ND[2.9E-03]	HEATED CANISTER	FID
CARBON TETRACHLORIDE		BPME1		ND[4.5E-03]	HEATED CANISTER	FID
CARBON TETRACHLORIDE		BPME2		ND[4.1E-03]	HEATED CANISTER	FID
CARBON TETRACHLORIDE		BPME3		2.3E-03	HEATED CANISTER	FID
CARBON TETRACHLORIDE		BPMF1		ND[2.2E-03]	HEATED CANISTER	FID
CARBON TETRACHLORIDE		BPMF2		3.0E-03	HEATED CANISTER	FID
CARBON TETRACHLORIDE		BPMJ		ND[5.3E-04]	HEATED CANISTER	FID
CARBON TETRACHLORIDE		BPMK		ND[7.7E-04]	HEATED CANISTER	FID
CARBON TETRACHLORIDE		BPML		ND[1.1E-03]	HEATED CANISTER	FID
CARBON TETRACHLORIDE		BPMM1		ND[2.8E-04]	HEATED CANISTER	FID
CARBON TETRACHLORIDE		BPMM2		ND[6.8E-03]	HEATED CANISTER	FID
CARBON TETRACHLORIDE		BPMN		ND[1.2E-03]	HEATED CANISTER	FID
CARBON TETRACHLORIDE		BPIA1		ND[2.3E-02]	HEATED CANISTER	FID
CARBON TETRACHLORIDE		BPIA2		ND[5.3E-02]	HEATED CANISTER	FID
CARBON TETRACHLORIDE		BPIB		ND[2.6E-02]	HEATED CANISTER	FID
CARBON TETRACHLORIDE		BPIC1		ND[1.5E-02]	HEATED CANISTER	FID
CARBON TETRACHLORIDE		BPID		ND[8.8E-03]	HEATED CANISTER	FID

TABLE 3 SUMMARY OF 'AIR TOXIC' EMISSIONS FROM KRAFT MILL BLEACH PLANTS, CONTD.

VOLATILE ORGANIC COMPOUND		MILL CODE	EMISSIONS RANGE lb/ADTBP	EMISSIONS AVG lb/ADTBP	TEST METHOD	COMMENTS
CARBON TETRACHLORIDE		BPIE1		ND[2.0E-02]	HEATED CANISTER	FID
CARBON TETRACHLORIDE		BPIE2		ND[2.1E-02]	HEATED CANISTER	FID
CARBON TETRACHLORIDE		BPIF1		ND[4.5E-02]	HEATED CANISTER	FID
CARBON TETRACHLORIDE		BPIF2		ND[2.7E-02]	HEATED CANISTER	FID
CARBON TETRACHLORIDE		BPIG		ND[9.7E-03]	HEATED CANISTER	FID
CARBON TETRACHLORIDE		BPIH1		ND[2.9E-02]	HEATED CANISTER	FID
CARBON TETRACHLORIDE		BPIH2		ND[2.2E-02]	HEATED CANISTER	FID
CARBON TETRACHLORIDE		BPII1		ND[1.2E-02]	HEATED CANISTER	FID
CARBON TETRACHLORIDE		BPII2		ND[2.5E-02]	HEATED CANISTER	FID
CARBON TETRACHLORIDE		BPIJ		ND[8.6E-03]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN*		
38	6		ND to 3.0E-03	4.2E-07		
3-CARENE		BPI	ND to 0.0278	1.6E-02	M18	
3-CARENE		BPJ	1E-4 to 9E-4	5.1E-04	M18	
3-CARENE		BPK1		ND [4.4E-03]	M18	
3-CARENE		BPK2		ND [7.4E-03]	M18	
3-CARENE		BPL1		ND[3.2E-03]	M18	
3-CARENE		BPL2		ND[0.004]	M18	
3-CARENE		BPL3		ND[0.006]	M18	
NO. OF TESTS	DETECTS		RANGE	MEDIAN*		
7	2		ND to 2.8E-02	1.3E-04		
CATECHOL		BPA2		ND[8.4E-06]	M0010	
CHLORINE		BPIB		ND[1.3E-04]	IMPINGER	NCASI METHOD
CHLORINE		BPIC1		ND[2.1E-05]	IMPINGER	NCASI METHOD
CHLORINE		BPID	0.0016 to 0.0091	5.1E-03	IMPINGER	NCASI METHOD
CHLORINE		BPIE1	0.587 to 0.655	6.1E-01	IMPINGER	NCASI METHOD
CHLORINE		BPIE2	0.587 to 0.656	6.1E-01	IMPINGER	NCASI METHOD
CHLORINE		BPIF1	0.0126 to 0.0269	1.8E-02	IMPINGER	NCASI METHOD
CHLORINE		BPIF2	0.0215 to 0.0453	2.8E-02	IMPINGER	NCASI METHOD
CHLORINE		BPIG	ND to 0.445	2.9E-01	IMPINGER	NCASI METHOD
CHLORINE		BPIH1		ND[2.9E-03]	IMPINGER	NCASI METHOD
CHLORINE		BPIH2	ND to 0.0961	3.6E-02	IMPINGER	NCASI METHOD
CHLORINE		BPII1	0.0579 to 0.0992	8.1E-02	IMPINGER	NCASI METHOD
CHLORINE		BPIJ		ND[4.2E-05]	IMPINGER	NCASI METHOD
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
12	8		ND to 0.656	2.3E-02		
CHLORINE DIOXIDE		BPIB		ND[8.5E-05]	IMPINGER	NCASI METHOD
CHLORINE DIOXIDE		BPIC1		ND[2.1E-05]	IMPINGER	NCASI METHOD
CHLORINE DIOXIDE		BPID	0.0010 to 0.0071	3.1E-03	IMPINGER	NCASI METHOD
CHLORINE DIOXIDE		BPIE1	0.235 to 0.397	3.1E-01	IMPINGER	NCASI METHOD
CHLORINE DIOXIDE		BPIE2	0.235 to 0.397	3.1E-01	IMPINGER	NCASI METHOD
CHLORINE DIOXIDE		BPIF1	0.0080 to 0.0173	1.0E-02	IMPINGER	NCASI METHOD
CHLORINE DIOXIDE		BPIF2	0.0117 to 0.0289	1.6E-02	IMPINGER	NCASI METHOD
CHLORINE DIOXIDE		BPIG	0.951 to 1.431	1.2E+00	IMPINGER	NCASI METHOD
CHLORINE DIOXIDE		BPIH1		ND[1.5E-03]	IMPINGER	NCASI METHOD
CHLORINE DIOXIDE		BPIH2	0.0219 to 0.1549	6.8E-02	IMPINGER	NCASI METHOD
CHLORINE DIOXIDE		BPII1	0.123 to 0.130	1.3E-01	IMPINGER	NCASI METHOD
CHLORINE DIOXIDE		BPIJ		ND[4.2E-05]	IMPINGER	NCASI METHOD
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
12	8		ND to 1.431	1.3E-02		

TABLE 3 SUMMARY OF 'AIR TOXIC' EMISSIONS FROM KRAFT MILL BLEACH PLANTS, CONTD.

VOLATILE ORGANIC COMPOUND		MILL CODE	EMISSIONS RANGE lb/ADTBP	EMISSIONS AVG lb/ADTBP	TEST METHOD	COMMENTS
CHLOROBENZENE		BPG		ND[1.5E-04]	VOST	
CHLOROBENZENE		BPMA1		ND[2.2E-04]	HEATED CANISTER	does not include DC & E tower vents
CHLOROBENZENE		BPMA2		9.3E-05	HEATED CANISTER	does not include DC tower vent
CHLOROBENZENE		BPMC1		1.0E-04	HEATED CANISTER	FID
CHLOROBENZENE		BPMC2		1.7E-04	HEATED CANISTER	FID
CHLOROBENZENE		BPME1		2.1E-04	HEATED CANISTER	FID
CHLOROBENZENE		BPME2		ND[2.5E-04]	HEATED CANISTER	FID
CHLOROBENZENE		BPME3		1.4E-04	HEATED CANISTER	FID
CHLOROBENZENE		BPMF1		ND[1.4E-04]	HEATED CANISTER	FID
CHLOROBENZENE		BPMF2		1.7E-04	HEATED CANISTER	FID
CHLOROBENZENE		BPMJ		1.8E-05	HEATED CANISTER	FID
CHLOROBENZENE		BPMK		ND[4.7E-05]	HEATED CANISTER	FID
CHLOROBENZENE		BPML		ND[6.4E-05]	HEATED CANISTER	FID
CHLOROBENZENE		BPMM1		ND[1.7E-05]	HEATED CANISTER	FID
CHLOROBENZENE		BPMM2		6.7E-04	HEATED CANISTER	FID
CHLOROBENZENE		BPMN		ND[7.3E-05]	HEATED CANISTER	FID
CHLOROBENZENE		BPIA1		ND[1.7E-02]	HEATED CANISTER	FID
CHLOROBENZENE		BPIA2		ND[3.9E-02]	HEATED CANISTER	FID
CHLOROBENZENE		BPIB		ND[1.9E-02]	HEATED CANISTER	FID
CHLOROBENZENE		BPIC1		ND[1.1E-02]	HEATED CANISTER	FID
CHLOROBENZENE		BPID		ND[6.5E-03]	HEATED CANISTER	FID
CHLOROBENZENE		BPIE1		ND[1.5E-02]	HEATED CANISTER	FID
CHLOROBENZENE		BPIE2		ND[1.5E-02]	HEATED CANISTER	FID
CHLOROBENZENE		BPIF1		ND[3.3E-02]	HEATED CANISTER	FID
CHLOROBENZENE		BPIF2		ND[2.0E-02]	HEATED CANISTER	FID
CHLOROBENZENE		BPIG		ND[7.1E-03]	HEATED CANISTER	FID
CHLOROBENZENE		BPIH1		ND[2.1E-02]	HEATED CANISTER	FID
CHLOROBENZENE		BPIH2		ND[1.6E-02]	HEATED CANISTER	FID
CHLOROBENZENE		BPII1		ND[8.8E-03]	HEATED CANISTER	FID
CHLOROBENZENE		BPII2		ND[1.8E-02]	HEATED CANISTER	FID
CHLOROBENZENE		BPIJ		ND[6.3E-03]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN*		
31	8		ND to 6.7E-04	1.3E-05		
CHLOROFORM		BPMA1		4.1E-02	HEATED CANISTER	does not include DC & E tower vents
CHLOROFORM		BPMA2		8.2E-02	HEATED CANISTER	does not include DC tower vent
CHLOROFORM		BPMC1		8.9E-02	HEATED CANISTER	FID
CHLOROFORM		BPMC2		6.2E-02	HEATED CANISTER	FID
CHLOROFORM		BPME1		9.9E-03	HEATED CANISTER	FID
CHLOROFORM		BPME2		7.8E-03	HEATED CANISTER	FID
CHLOROFORM		BPME3		7.7E-01	HEATED CANISTER	FID
CHLOROFORM		BPMF1		3.3E-01	HEATED CANISTER	FID
CHLOROFORM		BPMF2		1.2E-01	HEATED CANISTER	FID
CHLOROFORM		BPMJ		2.3E-02	HEATED CANISTER	FID
CHLOROFORM		BPMK		1.1E-01	HEATED CANISTER	FID
CHLOROFORM		BPML		2.2E-01	HEATED CANISTER	FID
CHLOROFORM		BPMM1		1.8E-02	HEATED CANISTER	FID
CHLOROFORM		BPMM2		2.7E-01	HEATED CANISTER	FID
CHLOROFORM		BPMN		2.0E-03	HEATED CANISTER	FID
CHLOROFORM		BPIA1	ND to 0.071	4.2E-02	HEATED CANISTER	FID
CHLOROFORM		BPIA2	0.043 to 0.046	4.4E-02	HEATED CANISTER	FID
CHLOROFORM		BPIB	0.360 to 0.400	3.8E-01	HEATED CANISTER	FID
CHLOROFORM		BPIC1	0.078 to 0.137	1.2E-01	HEATED CANISTER	FID, 2.4E-01 by CONTINUOUS
CHLOROFORM		BPIC2		4.8E-02	CONTINUOUS	
CHLOROFORM		BPIC3		1.4E-01	CONTINUOUS	5.1E-02 by HEATED CANISTER< FID
CHLOROFORM		BPIC4		1.3E-01	CONTINUOUS	
CHLOROFORM		BPID	0.038 to 0.044	4.0E-02	HEATED CANISTER	FID
CHLOROFORM		BPIE1	0.052 to 0.061	5.5E-02	HEATED CANISTER	FID
CHLOROFORM		BPIE2	0.053 to0.063	5.6E-02	HEATED CANISTER	FID
CHLOROFORM		BPIF1	0.109 to 0.156	1.2E-01	HEATED CANISTER	FID
CHLOROFORM		BPIF2	0.170 to 0.240	2.1E-01	HEATED CANISTER	FID
CHLOROFORM		BPIG	0.023 to 0.035	2.9E-02	HEATED CANISTER	FID

TABLE 3 SUMMARY OF 'AIR TOXIC' EMISSIONS FROM KRAFT MILL BLEACH PLANTS, CONTD.

VOLATILE ORGANIC COMPOUND		MILL CODE	EMISSIONS RANGE lb/ADTBP	EMISSIONS AVG lb/ADTBP	TEST METHOD	COMMENTS
CHLOROFORM		BPIH1	ND to 0.086	5.4E-02	HEATED CANISTER	FID
CHLOROFORM		BPIH2	0.126 to 0.231	1.8E-01	HEATED CANISTER	FID
CHLOROFORM		BPII1	0.014 to 0.047	3.2E-02	HEATED CANISTER	FID
CHLOROFORM		BPII2	0.085 to 0.142	1.1E-01	HEATED CANISTER	FID, 6.5E-02 by CONTINUOUS
CHLOROFORM		BPIJ	0.033 to 0.047	4.1E-02	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
33	33		ND to 0.77	6.2E-02		
*Note: Chloroform emissions are a function of bleaching conditions; See end of Table for ways to estimate chloroform generation and emission						
CHLOROMETHANE		BPG		ND[6.8E-04]	VOST	
m- CRESOL		BPII1		ND[8.5E-03]	HEATED CANISTER	FID
m- CRESOL		BPII2		ND[1.7E-02]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
2	0		ND	ND		
o- CRESOL		BPIA1		ND[1.6E-02]	HEATED CANISTER	FID
o- CRESOL		BPIA2		ND[3.7E-02]	HEATED CANISTER	FID
o- CRESOL		BPIB		ND[1.8E-02]	HEATED CANISTER	FID
o- CRESOL		BPIC1		ND[1.1E-02]	HEATED CANISTER	FID
o- CRESOL		BPID		ND[6.3E-03]	HEATED CANISTER	FID
o- CRESOL		BPIE1		ND[1.4E-02]	HEATED CANISTER	FID
o- CRESOL		BPIE2		ND[1.5E-02]	HEATED CANISTER	FID
o- CRESOL		BPIF1		ND[3.2E-02]	HEATED CANISTER	FID
o- CRESOL		BPIF2		ND[1.9E-02]	HEATED CANISTER	FID
o- CRESOL		BPIG		ND[6.8E-03]	HEATED CANISTER	FID
o- CRESOL		BPIH1		ND[2.0E-02]	HEATED CANISTER	FID
o- CRESOL		BPIH2		ND[1.6E-02]	HEATED CANISTER	FID
o- CRESOL		BPII1		ND[8.5E-03]	HEATED CANISTER	FID
o- CRESOL		BPII2		ND[1.7E-02]	HEATED CANISTER	FID
o- CRESOL		BPIJ	0.009 to 0.017	1.3E-02	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN**		
15	1		ND to 0.017	5.6E-04		
CROTONALDEHYDE		BPIA1		ND[2.1E-04]	IMPINGER	DNPH
CROTONALDEHYDE		BPIA2		ND[5.5E-04]	IMPINGER	DNPH
CROTONALDEHYDE		BPIB		ND[1.8E-03]	IMPINGER	DNPH
CROTONALDEHYDE		BPID		ND[2.1E-04]	IMPINGER	DNPH
CROTONALDEHYDE		BPIE1		ND[2.3E-04]	IMPINGER	DNPH
CROTONALDEHYDE		BPIE2		ND[2.3E-04]	IMPINGER	DNPH
CROTONALDEHYDE		BPIF1		ND[1.6E-04]	IMPINGER	DNPH
CROTONALDEHYDE		BPIF2		ND[5.8E-05]	IMPINGER	DNPH
CROTONALDEHYDE		BPIG		ND[2.1E-04]	IMPINGER	DNPH
CROTONALDEHYDE		BPIH1		ND[3.2E-04]	IMPINGER	DNPH
CROTONALDEHYDE		BPIH2		ND[2.1E-04]	IMPINGER	DNPH
CROTONALDEHYDE		BPIJ	ND to 1.8E-04	9.5E-05	IMPINGER	DNPH
NO. OF TESTS	DETECTS		RANGE	MEDIAN**		
12	1		ND to 1.8E-04	4.9E-06		
CUMENE		BPG		1.7E-04	VOST	
CUMENE		BPI		ND [0.0056]	M18	
CUMENE		BPJ	9E-5 to 5E-4	2.7E-04	M18	
CUMENE		BPK1		ND [0.0044]	M18	
CUMENE		BPK2		ND [0.0074]	M18	

TABLE 3 SUMMARY OF 'AIR TOXIC' EMISSIONS FROM KRAFT MILL BLEACH PLANTS, CONTD.

VOLATILE ORGANIC COMPOUND		MILL CODE	EMISSIONS RANGE lb/ADTBP	EMISSIONS AVG lb/ADTBP	TEST METHOD	COMMENTS
CUMENE		BPL1		ND[0.0032]	M18	
CUMENE		BPL2		ND[0.004]	M18	
CUMENE		BPL3		ND[0.008]	M18	
CUMENE		BPIA1		ND[0.018]	HEATED CANISTER	FID
CUMENE		BPIA2		ND[0.042]	HEATED CANISTER	FID
CUMENE		BPIB		ND[0.016]	HEATED CANISTER	FID
CUMENE		BPIC1		ND[0.012]	HEATED CANISTER	FID
CUMENE		BPID		ND[0.0069]	HEATED CANISTER	FID
CUMENE		BPIE1		ND[0.016]	HEATED CANISTER	FID
CUMENE		BPIE2		ND[0.016]	HEATED CANISTER	FID
CUMENE		BPIF1		ND[0.035]	HEATED CANISTER	FID
CUMENE		BPIF2		ND[0.021]	HEATED CANISTER	FID
CUMENE		BPIG		ND[0.0075]	HEATED CANISTER	FID
CUMENE		BPIH1		ND[0.022]	HEATED CANISTER	FID
CUMENE		BPIH2		ND[0.017]	HEATED CANISTER	FID
CUMENE		BPIJ		ND[0.0068]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN**		
21	2		ND to 5.0E-04	1.3E-05		
CYCLOHEXANONE		BPID		ND[3.2E-04]	IMPINGER	DNPH
CYCLOHEXANONE		BPIE1		ND[3.3E-04]	IMPINGER	DNPH
CYCLOHEXANONE		BPIE2		ND[3.3E-04]	IMPINGER	DNPH
CYCLOHEXANONE		BPIF1	ND to 0.0006	3.2E-04	IMPINGER	DNPH
CYCLOHEXANONE		BPIF2	ND to 0.0002	9.4E-05	IMPINGER	DNPH
CYCLOHEXANONE		BPIG		ND[2.1E-04]	IMPINGER	DNPH
NO. OF TESTS	DETECTS		RANGE	MEDIAN**		
6	2		ND to 6.0E-04	2.9E-05		
p-CYMENE		BPG	8.0E-7 to 1.5E-4	5.1E-05	VOST	
p-CYMENE		BPI	ND to 0.0032	2.7E-03	M18	
p-CYMENE		BPJ	1.8E-4 to 1.4E-3	8.0E-04	M18	
p-CYMENE		BPK1		ND [0.004]	M18	
p-CYMENE		BPK2		ND [0.007]	M18	
p-CYMENE		BPL1		ND[0.003]	M18	
p-CYMENE		BPL2		ND[0.004]	M18	
p-CYMENE		BPL3		ND[0.008]	M18	
NO. OF TESTS	DETECTS		RANGE	MEDIAN*		
8	3		ND to 3.2E-03	1.3E-05		
1,2-DIBROMOMETHANE		BPC1b	<29.3-57.8 ug/m3	2.3E-04	CARB 422	
1,2-DIBROMOMETHANE		BPDb	<293 - 781 ug/m3	8.2E-04	CARB 422	
1,2-DIBROMOMETHANE		BPG	1.2E-6 to 1.1E-4	2.7E-05	VOST	
1,2-DIBROMOMETHANE		BPL1		ND[0.003]	M18	
1,2-DIBROMOMETHANE		BPL2		ND[0.004]	M18	
1,2-DIBROMOMETHANE		BPL3		ND[0.008]	M18	
NO. OF TESTS	DETECTS		RANGE	MEDIAN*		
6	3		ND to 8.2E-04	2.0E-05		
1,1-DICHLOROETHANE		BPG		ND[9.7E-05]	VOST	
1,2-DICHLOROETHANE		BPG		ND[6.9E-05]	VOST	
1,2-DICHLOROETHANE		BPMA1		ND[7.8E-04]	HEATED CANISTER	does not include DC & E tower vents
1,2-DICHLOROETHANE		BPMA2		2.4E-04	HEATED CANISTER	does not include DC tower vent
1,2-DICHLOROETHANE		BPMC1		ND[5.2E-04]	HEATED CANISTER	FID
1,2-DICHLOROETHANE		BPMC2		ND[6.2E-04]	HEATED CANISTER	FID

TABLE 3 SUMMARY OF 'AIR TOXIC' EMISSIONS FROM KRAFT MILL BLEACH PLANTS, CONTD.

VOLATILE ORGANIC COMPOUND	MILL CODE	EMISSIONS RANGE lb/ADTBP	EMISSIONS AVG lb/ADTBP	TEST METHOD	COMMENTS
1,2-DICHLOROETHANE	BPME1		ND[9.6E-04]	HEATED CANISTER	FID
1,2-DICHLOROETHANE	BPME2		ND[8.7E-04]	HEATED CANISTER	FID
1,2-DICHLOROETHANE	BPME3		ND[9.8E-04]	HEATED CANISTER	FID
1,2-DICHLOROETHANE	BPMF1		ND[4.8E-04]	HEATED CANISTER	FID
1,2-DICHLOROETHANE	BPMF2		ND[1.1E-03]	HEATED CANISTER	FID
1,2-DICHLOROETHANE	BPMJ		ND[1.1E-04]	HEATED CANISTER	FID
1,2-DICHLOROETHANE	BPMK		ND[1.7E-04]	HEATED CANISTER	FID
1,2-DICHLOROETHANE	BPML		ND[2.3E-04]	HEATED CANISTER	FID
1,2-DICHLOROETHANE	BPMM1		ND[6.0E-05]	HEATED CANISTER	FID
1,2-DICHLOROETHANE	BPMM2		1.0E-03	HEATED CANISTER	FID
1,2-DICHLOROETHANE	BPMN		ND[2.5E-04]	HEATED CANISTER	FID
1,2-DICHLOROETHANE	BPII1		ND[7.7E-03]	HEATED CANISTER	FID
1,2-DICHLOROETHANE	BPII2		ND[1.6E-02]	HEATED CANISTER	FID
NO. OF TESTS / DETECTS		RANGE	MEDIAN**		
18 / 2		ND to 1.0E-03	2.2E-04		
1,1-DICHLOROETHENE	BPG		ND[1.8E-03]	VOST	
1,2-DICHLOROPROPANE	BPG		ND[9.1E-05]	VOST	
1,2-DICHLOROETHYLENE	BPMA1		4.4E-04	HEATED CANISTER	does not include DC & E tower vents
1,2-DICHLOROETHYLENE	BPMA2		1.5E-04	HEATED CANISTER	does not include DC tower vent
1,2-DICHLOROETHYLENE	BPMC1		5.0E-04	HEATED CANISTER	FID
1,2-DICHLOROETHYLENE	BPMC2		ND[4.5E-04]	HEATED CANISTER	FID
1,2-DICHLOROETHYLENE	BPME1		ND[7.1E-04]	HEATED CANISTER	FID
1,2-DICHLOROETHYLENE	BPME2		3.2E-04	HEATED CANISTER	FID
1,2-DICHLOROETHYLENE	BPME3		3.6E-04	HEATED CANISTER	FID
1,2-DICHLOROETHYLENE	BPMF1		ND[3.5E-04]	HEATED CANISTER	FID
1,2-DICHLOROETHYLENE	BPMF2		4.2E-04	HEATED CANISTER	FID
1,2-DICHLOROETHYLENE	BPMJ		6.0E-05	HEATED CANISTER	FID
1,2-DICHLOROETHYLENE	BPMK		ND[1.2E-04]	HEATED CANISTER	FID
1,2-DICHLOROETHYLENE	BPML		ND[1.7E-04]	HEATED CANISTER	FID
1,2-DICHLOROETHYLENE	BPMM1		ND[4.4E-05]	HEATED CANISTER	FID
1,2-DICHLOROETHYLENE	BPMM2		6.1E-04	HEATED CANISTER	FID
1,2-DICHLOROETHYLENE	BPMN		1.9E-04	HEATED CANISTER	FID
1,2-DICHLOROETHYLENE	BPII1		ND[7.5E-03]	HEATED CANISTER	FID
1,2-DICHLOROETHYLENE	BPII2		ND[1.5E-02]	HEATED CANISTER	FID
NO. OF TESTS / DETECTS		RANGE	MEDIAN		
17 / 9		ND to 6.1E-04	6.0E-05		
DIMETHYL DISULFIDE	BPG		ND[1.2E-04]	VOST	
DIMETHYL DISULFIDE	BPME1		ND[1.1E-02]	HEATED CANISTER	FID
DIMETHYL DISULFIDE	BPME2		ND[1.0E-02]	HEATED CANISTER	FID
DIMETHYL DISULFIDE	BPME3		ND[1.2E-02]	HEATED CANISTER	FID
DIMETHYL DISULFIDE	BPMF1		ND[5.7E-03]	HEATED CANISTER	FID
DIMETHYL DISULFIDE	BPMF2		6.8E-03	HEATED CANISTER	FID
DIMETHYL DISULFIDE	BPMJ		ND[1.4E-03]	HEATED CANISTER	FID
DIMETHYL DISULFIDE	BPMK		ND[2.0E-03]	HEATED CANISTER	FID
DIMETHYL DISULFIDE	BPML		ND[2.7E-03]	HEATED CANISTER	FID
DIMETHYL DISULFIDE	BPMM1		ND[7.1E-04]	HEATED CANISTER	FID
DIMETHYL DISULFIDE	BPMM2		ND[1.7E-02]	HEATED CANISTER	FID
DIMETHYL DISULFIDE	BPMN		ND[3.0E-03]	HEATED CANISTER	FID
DIMETHYL DISULFIDE	BPIA1		ND[1.4E-02]	HEATED CANISTER	FID
DIMETHYL DISULFIDE	BPIA2		ND[3.2E-02]	HEATED CANISTER	FID
DIMETHYL DISULFIDE	BPIB		ND[1.6E-02]	HEATED CANISTER	FID
DIMETHYL DISULFIDE	BPIC1		ND[9.0E-03]	HEATED CANISTER	FID
DIMETHYL DISULFIDE	BPID		ND[5.4E-03]	HEATED CANISTER	FID
DIMETHYL DISULFIDE	BPIE1	0.068 to 0.27*	1.8E-01	HEATED CANISTER	FID

TABLE 3 SUMMARY OF 'AIR TOXIC' EMISSIONS FROM KRAFT MILL BLEACH PLANTS, CONTD.

VOLATILE ORGANIC COMPOUND		MILL CODE	EMISSIONS RANGE lb/ADTBP	EMISSIONS AVG lb/ADTBP	TEST METHOD	COMMENTS
DIMETHYL DISULFIDE		BPIE2	0.010 to 0.030	1.6E-02	HEATED CANISTER	FID
DIMETHYL DISULFIDE		BPIF1	0.017 to 0.035	1.9E-02	HEATED CANISTER	FID
DIMETHYL DISULFIDE		BPIF2	0.012 to 0.024	1.4E-02	HEATED CANISTER	FID
DIMETHYL DISULFIDE		BPIG		ND[5.9E-03]	HEATED CANISTER	FID
DIMETHYL DISULFIDE		BPIH1		ND[1.7E-02]	HEATED CANISTER	FID
DIMETHYL DISULFIDE		BPIH2		ND[1.4E-02]	HEATED CANISTER	FID
DIMETHYL DISULFIDE		BPII1		ND[7.3E-03]	HEATED CANISTER	FID
DIMETHYL DISULFIDE		BPII2		ND[1.5E-02]	HEATED CANISTER	FID
DIMETHYL DISULFIDE		BPIJ		ND[5.3E-03]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN*		
27	5		ND to 2.7E-01	4.7E-04		
DIMETHYL SULFIDE		BPG		ND[1.4E-05]	VOST	
DIMETHYL SULFIDE		BPME1		ND[7.5E-03]	HEATED CANISTER	FID
DIMETHYL SULFIDE		BPME2		ND[6.8E-03]	HEATED CANISTER	FID
DIMETHYL SULFIDE		BPME3		ND[7.7E-03]	HEATED CANISTER	FID
DIMETHYL SULFIDE		BPMF1		3.0E-03	HEATED CANISTER	FID
DIMETHYL SULFIDE		BPMF2		5.4E-03	HEATED CANISTER	FID
DIMETHYL SULFIDE		BPMJ		ND[9.0E-04]	HEATED CANISTER	FID
DIMETHYL SULFIDE		BPMK		ND[1.3E-03]	HEATED CANISTER	FID
DIMETHYL SULFIDE		BPML		ND[1.8E-03]	HEATED CANISTER	FID
DIMETHYL SULFIDE		BPMM1		ND[4.7E-04]	HEATED CANISTER	FID
DIMETHYL SULFIDE		BPMM2		8.7E-03	HEATED CANISTER	FID, U
DIMETHYL SULFIDE		BPMN		ND[2.0E-03]	HEATED CANISTER	FID
DIMETHYL SULFIDE		BPIA1	0.037 to 0.105	7.7E-02	HEATED CANISTER	FID
DIMETHYL SULFIDE		BPIA2	0.011 to 0.036	1.9E-02	HEATED CANISTER	FID
DIMETHYL SULFIDE		BPIB	0.008 to 0.010	8.7E-03	HEATED CANISTER	FID
DIMETHYL SULFIDE		BPIC1		ND[6.0E-03]	HEATED CANISTER	FID
DIMETHYL SULFIDE		BPID		ND[3.6E-03]	HEATED CANISTER	FID
DIMETHYL SULFIDE		BPIE1	0.105 to 0.173	1.3E-01	HEATED CANISTER	FID
DIMETHYL SULFIDE		BPIE2	0.028 to 0.056	4.4E-02	HEATED CANISTER	FID
DIMETHYL SULFIDE		BPIF1	0.014 to 0.033	2.1E-02	HEATED CANISTER	FID
DIMETHYL SULFIDE		BPIF2	0.011 to 0.026	1.7E-02	HEATED CANISTER	FID
DIMETHYL SULFIDE		BPIG		ND[3.9E-03]	HEATED CANISTER	FID
DIMETHYL SULFIDE		BPIH1		ND[1.2E-02]	HEATED CANISTER	FID
DIMETHYL SULFIDE		BPIH2		ND[9.0E-03]	HEATED CANISTER	FID
DIMETHYL SULFIDE		BPII1	ND to 0.005	3.5E-03	HEATED CANISTER	FID
DIMETHYL SULFIDE		BPII2		ND[9.9E-03]	HEATED CANISTER	FID
DIMETHYL SULFIDE		BPIJ		ND[3.5E-03]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN*		
27	11		ND to 1.7E-01	2.1E-03		
ETHANOL		BPI	ND to 0.0042	3.5E-03	M18	
ETHANOL		BPJ		ND [0.009]	M18	
ETHANOL		BPK1		ND [0.0044]	M18	
ETHANOL		BPK2	ND to 2.2E-4	1.5E-04	M18	
ETHANOL		BPL1		ND[0.0032]	M18	
ETHANOL		BPL2	ND to 0.008	4.0E-03	M18	
ETHANOL		BPL3		ND[0.008]	M18	
ETHANOL		BPIA1		ND[6.8E-03]	HEATED CANISTER	FID
ETHANOL		BPIA2	ND to 0.033	1.6E-02	HEATED CANISTER	FID
ETHANOL		BPIB	0.012 to 0.018	1.5E-02	HEATED CANISTER	FID
ETHANOL		BPIC1	ND to 0.007	2.9E-03	HEATED CANISTER	FID
ETHANOL		BPIC3		1.7E-03	HEATED CANISTER	FID
ETHANOL		BPIC4		2.5E-03	HEATED CANISTER	FID
ETHANOL		BPID		ND[2.7E-03]	HEATED CANISTER	FID
ETHANOL		BPIE1		ND[6.0E-03]	HEATED CANISTER	FID
ETHANOL		BPIE2		ND[8.3E-03]	HEATED CANISTER	FID
ETHANOL		BPIF1		ND[1.3E-02]	HEATED CANISTER	FID
ETHANOL		BPIF2		ND[8.2E-03]	HEATED CANISTER	FID

TABLE 3 SUMMARY OF 'AIR TOXIC' EMISSIONS FROM KRAFT MILL BLEACH PLANTS, CONTD.

VOLATILE ORGANIC COMPOUND		MILL CODE	EMISSIONS RANGE lb/ADTBP	EMISSIONS AVG lb/ADTBP	TEST METHOD	COMMENTS
ETHANOL		BPIG		ND[2.9E-03]	HEATED CANISTER	FID
ETHANOL		BPIH1		ND[8.6E-03]	HEATED CANISTER	FID
ETHANOL		BPIH2		ND[6.7E-03]	HEATED CANISTER	FID
ETHANOL		BPII1		ND[3.6E-03]	HEATED CANISTER	FID
ETHANOL		BPII2		ND[7.3E-03]	HEATED CANISTER	FID
ETHANOL		BPIJ		ND[2.5E-03]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN*		
24	8		ND to 3.3E-02	2.1E-04		
ETHYL BENZENE		BPG	0.0 to 1.6E-4	3.4E-05	VOST	
ETHYL BENZENE		BPI		ND [0.0054]	M18	
ETHYL BENZENE		BPJ		ND [0.0056]	M18	
ETHYL BENZENE		BPK1		ND [0.0042]	M18	
ETHYL BENZENE		BPK2		ND [0.0074]	M18	
ETHYL BENZENE		BPL1		ND[0.0032]	M18	
ETHYL BENZENE		BPL2		ND[0.004]	M18	
ETHYL BENZENE		BPL3		ND[0.008]	M18	
ETHYL BENZENE		BPIA1		ND[1.6E-02]	HEATED CANISTER	FID
ETHYL BENZENE		BPIA2		ND[3.7E-02]	HEATED CANISTER	FID
ETHYL BENZENE		BPIB		ND[1.8E-02]	HEATED CANISTER	FID
ETHYL BENZENE		BPID		ND[6.0E-03]	HEATED CANISTER	FID
ETHYL BENZENE		BPIE1		ND[1.4E-02]	HEATED CANISTER	FID
ETHYL BENZENE		BPIE2		ND[1.5E-02]	HEATED CANISTER	FID
ETHYL BENZENE		BPIF1		ND[5.0E-04]	HEATED CANISTER	FID
ETHYL BENZENE		BPIF2		ND[5.0E-04]	HEATED CANISTER	FID
ETHYL BENZENE		BPIH1		ND[2.0E-02]	HEATED CANISTER	FID
ETHYL BENZENE		BPIH2		ND[1.5E-02]	HEATED CANISTER	FID
ETHYL BENZENE		BPII1		ND[8.3E-03]	HEATED CANISTER	FID
ETHYL BENZENE		BPII2		ND[1.7E-02]	HEATED CANISTER	FID
ETHYL BENZENE		BPIJ		ND[5.9E-03]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN**		
21	1		ND to 3.4E-05	1.1E-06		
FORMALDEHYDE		BPC1b	4.2E-4 to 5.3E-4	4.8E-04	CARB 430	
FORMALDEHYDE		BPBPM	1.0E-3 to 1.1E-3	1.1E-03	CARB 430	
FORMALDEHYDE		BPDb	1.06-161.0 mg/m3	5.9E-02	CARB 430	
FORMALDEHYDE		BPG	2.0E-4 to 2.8E-4	2.3E-04	RTI DRAFT	
FORMALDEHYDE		BPMK		2.1E-03	IMPINGER	DNPH
FORMALDEHYDE		BPML		ND[5.8E-5]	IMPINGER	DNPH
FORMALDEHYDE		BPMM1		ND[8.6E-04]	IMPINGER	DNPH
FORMALDEHYDE		BPMM2		ND[2.1E-02]	IMPINGER	DNPH
FORMALDEHYDE		BPMN		ND[4 1E-04]	IMPINGER	DNPH
FORMALDEHYDE		BPIA1	ND to 0.00033	2.3E-04	IMPINGER	DNPH
FORMALDEHYDE		BPIA2	0.0005 to 0.0016	9.1E-04	IMPINGER	DNPH
FORMALDEHYDE		BPIB		ND[1.5E-03]	IMPINGER	DNPH
FORMALDEHYDE		BPIC1	ND to 0.0023	7.6E-04	IMPINGER	DNPH
FORMALDEHYDE		BPIC2		6.7E-04	IMPINGER	DNPH
FORMALDEHYDE		BPIC3		4.6E-04	IMPINGER	DNPH
FORMALDEHYDE		BPID	0.00036 to 0.00078	5.5E-04	IMPINGER	DNPH
FORMALDEHYDE		BPIE1	ND to 0.00022	1.3E-04	IMPINGER	DNPH
FORMALDEHYDE		BPIE2	ND to 0.00022	1.3E-04	IMPINGER	DNPH
FORMALDEHYDE		BPIF1	0.00018 to 0.00029	2.3E-04	IMPINGER	DNPH
FORMALDEHYDE		BPIF2	ND to 0.000074	3.3E-05	IMPINGER	DNPH
FORMALDEHYDE		BPIG	.00094 to 0.0019	1.3E-03	IMPINGER	DNPH
FORMALDEHYDE		BPIH1		ND[3.2E-04]	IMPINGER	DNPH
FORMALDEHYDE		BPIH2	ND to 0.00051	2.4E-04	IMPINGER	DNPH
FORMALDEHYDE		BPIJ	0.00046 to 0.0011	8.2E-04	IMPINGER	DNPH
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
24	18		ND to 5.9E-02	2.4E-04		

TABLE 3 SUMMARY OF 'AIR TOXIC' EMISSIONS FROM KRAFT MILL BLEACH PLANTS, CONTD.

VOLATILE ORGANIC COMPOUND		MILL CODE	EMISSIONS RANGE lb/ADTBP	EMISSIONS AVG lb/ADTBP	TEST METHOD	COMMENTS
HEXACHLOROCYCLOPENTIDIEN		BPIC1	0.014 to 0.026	1.6E-02	HEATED CANISTER	FID
HEXACHLOROCYCLOPENTIDIEN		BPIF1		ND[7.8E-02]	HEATED CANISTER	FID
HEXACHLOROCYCLOPENTIDIEN		BPIF2		ND[4.7E-02]	HEATED CANISTER	FID
HEXACHLOROCYCLOPENTIDIEN		BPIG		ND[1.7E-02]	HEATED CANISTER	FID
HEXACHLOROCYCLOPENTIDIEN		BPII1		ND[2.1E-02]	HEATED CANISTER	FID
HEXACHLOROCYCLOPENTIDIEN		BPII2		ND[4.4E-02]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN**		
6	1		ND to 0.026	1.6E-03		
HEXACHLOROETHANE		BPIC1		ND[2.2E-02]	HEATED CANISTER	FID
HEXACHLOROETHANE		BPIC3		2.5E-02	HEATED CANISTER	FID
HEXACHLOROETHANE		BPIF1		ND[6.8E-02]	HEATED CANISTER	FID
HEXACHLOROETHANE		BPIF2		ND[4.1E-02]	HEATED CANISTER	FID
HEXACHLOROETHANE		BPIG		ND[1.5E-02]	HEATED CANISTER	FID
HEXACHLOROETHANE		BPII1		ND[1.9E-02]	HEATED CANISTER	FID
HEXACHLOROETHANE		BPII2		ND[3.8E-02]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN**		
7	1		ND to 0.025	2.1E-03		
n-HEXANE		BPG		ND[1.8E-04]	VOST	
n-HEXANE		BPMK		2.8E-05	HEATED CANISTER	FID
n-HEXANE		BPML		ND[4.9E-05]	HEATED CANISTER	FID
n-HEXANE		BPMM1		ND[1.3E-05]	HEATED CANISTER	FID
n-HEXANE		BPMM2		2.1E-04	HEATED CANISTER	FID
n-HEXANE		BPMN		3.1E-05	HEATED CANISTER	FID
n-HEXANE		BPIA1		ND[2.1E-02]	HEATED CANISTER	FID
n-HEXANE		BPIA2		ND[3.0E-02]	HEATED CANISTER	FID
n-HEXANE		BPIB		ND[1.4E-02]	HEATED CANISTER	FID
n-HEXANE		BPIC1		ND[8.2E-03]	HEATED CANISTER	FID
n-HEXANE		BPID		ND[5.0E-03]	HEATED CANISTER	FID
n-HEXANE		BPIE1		ND[1.1E-02]	HEATED CANISTER	FID
n-HEXANE		BPIE2		ND[1.2E-02]	HEATED CANISTER	FID
n-HEXANE		BPIF1		ND[2.5E-02]	HEATED CANISTER	FID
n-HEXANE		BPIF2		ND[1.5E-02]	HEATED CANISTER	FID
n-HEXANE		BPIG		ND[5.4E-03]	HEATED CANISTER	FID
n-HEXANE		BPIH1		ND[1.6E-02]	HEATED CANISTER	FID
n-HEXANE		BPIH2		ND[1.3E-02]	HEATED CANISTER	FID
n-HEXANE		BPII1		ND[6.8E-03]	HEATED CANISTER	FID
n-HEXANE		BPII2		ND[1.4E-02]	HEATED CANISTER	FID
n-HEXANE		BPIJ		ND[4.9E-03]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN*		
21	3		ND to 2.1E-04	8.6E-07		
HYDROCHLORIC ACID		BPI	2.6E-3 to 5.4E-3	4.0E-03	M26	Note: M26 is not an approved method
HYDROCHLORIC ACID		BPJ	1.5E-2 to 1.7E-2	1.6E-02	M26	Note: M26 is not an approved method
HYDROCHLORIC ACID		BPK1	2.5E-3 to 3.5E-3	3.0E-03	M26	Note: M26 is not an approved method
HYDROCHLORIC ACID		BPK2	4.1E-2 to 8.1E-2	6.1E-02	M26	Note: M26 is not an approved method
HYDROCHLORIC ACID		BPID	ND to 0.062	2.3E-02	M26A	Note: M26 is not an approved method
HYDROCHLORIC ACID		BPIH1		2.6E-02	M26A	Note: M26 is not an approved method
HYDROCHLORIC ACID		BPIH2	0.022 to 0.024	2.3E-02	M26A	Note: M26 is not an approved method
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
7	7		ND to 8.1E-02	2.3E-02		
IODOMETHANE		BPG		ND[5.3E-05]	VOST	

TABLE 3 SUMMARY OF 'AIR TOXIC' EMISSIONS FROM KRAFT MILL BLEACH PLANTS, CONTD.

VOLATILE ORGANIC COMPOUND		MILL CODE	EMISSIONS RANGE lb/ADTBP	EMISSIONS AVG lb/ADTBP	TEST METHOD	COMMENTS
ISOPROPANOL		BPI	1.2E-3 to 1.4E-3	1.3E-03	M18	
ISOPROPANOL		BPJ		ND [0.0056]	M18	
ISOPROPANOL		BPK1	1.6E-5 to 4.9E-5	3.3E-05	M18	
ISOPROPANOL		BPK2	2.9E-3 to 3.1E-3	3.0E-03	M18	
ISOPROPANOL		BPL1		ND[0.0032]	M18	
ISOPROPANOL		BPL2		ND[0.004]	M18	
ISOPROPANOL		BPL3		ND[0.008]	M18	
ISOPROPANOL		BPIA1		ND[0.069]	HEATED CANISTER	FID
ISOPROPANOL		BPIA2		ND[0.021]	HEATED CANISTER	FID
ISOPROPANOL		BPIB		ND[0.010]	HEATED CANISTER	FID
ISOPROPANOL		BPID		ND[0.0035]	HEATED CANISTER	FID
ISOPROPANOL		BPIE1		ND[0.0078]	HEATED CANISTER	FID
ISOPROPANOL		BPIE2		ND[0.0082]	HEATED CANISTER	FID
ISOPROPANOL		BPIF1		ND[0.00029]	HEATED CANISTER	FID
ISOPROPANOL		BPIF2		ND[0.00029]	HEATED CANISTER	FID
ISOPROPANOL		BPIH1		ND[0.011]	HEATED CANISTER	FID
ISOPROPANOL		BPIH2		ND[0.0067]	HEATED CANISTER	FID
ISOPROPANOL		BPII1		ND[0.0047]	HEATED CANISTER	FID
ISOPROPANOL		BPII2		ND to 0.021	HEATED CANISTER	FID
ISOPROPANOL		BPIJ		ND[0.0034]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN*		
20	3		ND to 2.1E-02	1.3E-07		
METHANOL		BPA1	0.002 to 0.22	1.0E-01	IMPINGER	NCASI METHOD
METHANOL		BPA2	3.49 to 4.05	3.8E+00	IMPINGER	NCASI METHOD
METHANOL		BPB	0.29 to 0.32	3.1E-01	IMPINGER	NCASI METHOD
METHANOL		BPC1b	1.1E-4 to 1.4E-3	5.7E-04	MOD NIOSH 2000	
METHANOL		BPBPM	0.0137 to 0.142	1.4E-02	MOD NIOSH 2000	
METHANOL		BPDb	<7 to 697 mg/m3	8.3E-01	WATER TRAIN	
METHANOL		BPE	0.025 to 0.09	5.1E-02	MOD NIOSH 2000	
METHANOL		BPF	0.37 to 0.42	3.9E-01	IMPINGER	NCASI METHOD
METHANOL		BPG	-	1.5E-01	VOST	
METHANOL		BPH	0.003 to 0.008	6.3E-03	IMPINGER	NCASI METHOD
METHANOL		BPI	0.055 to 0.123	8.7E-02	M18	
METHANOL		BPJ	0.054 to 0.128	9.0E-02	M18	
METHANOL		BPK1	0.100 to 0.253	3.0E-03	M18	
METHANOL		BPK2	0.250 to 0.480	3.5E-01	M18	
METHANOL		BPL1	0.0192 to 0.0224	1.9E-02	M18	
METHANOL		BPL2	0.080 to 0.106	9.2E-02	M18	
METHANOL		BPL3	0.072 to 0.088	8.0E-02	M18	
METHANOL		BPM	0.097 to 0.227	1.6E-01	M18	
METHANOL		BPMA1		2.2E-01	HEATED CANISTER	does not include DC & E tower vents
METHANOL		BPMA2		1.3E-01	HEATED CANISTER	does not include DC tower vent
METHANOL		BPMC1		1.2E-01	HEATED CANISTER	FID
METHANOL		BPMC2		1.3E-01	HEATED CANISTER	FID
METHANOL		BPME1		1.9E-01	HEATED CANISTER	FID
METHANOL		BPME2		8.3E-02	HEATED CANISTER	FID
METHANOL		BPME3		5.2E-02	HEATED CANISTER	FID
METHANOL		BPMF1		1.2E-01	HEATED CANISTER	FID
METHANOL		BPMF2		5.2E-01	HEATED CANISTER	FID
METHANOL		BPMJ		1.8E-01	HEATED CANISTER	FID
METHANOL		BPMK		4.2E-02	HEATED CANISTER	FID
METHANOL		BPML		4.9E-02	HEATED CANISTER	FID
METHANOL		BPMM1		1.1E-02	HEATED CANISTER	FID
METHANOL		BPMM2		3.4E-01	HEATED CANISTER	FID
METHANOL		BPMN		1.7E-01	HEATED CANISTER	FID
METHANOL		BPIA1	0.058 to 0.156	1.1E-01	HEATED CANISTER	FID
METHANOL		BPIA2	0.067 to 0.267	1.5E-01	HEATED CANISTER	FID
METHANOL		BPIB	0.502 to 0.710	6.0E-01	HEATED CANISTER	FID
METHANOL		BPIC1	0.236 to 0.291	2.6E-01	HEATED CANISTER	FID, coeluted with ACETALDEHYDE
METHANOL		BPIC2		1.5E-01	HEATED CANISTER	FID, coeluted with ACETALDEHYDE
METHANOL		BPIC3		2.1E-01	HEATED CANISTER	FID, coeluted with ACETALDEHYDE

TABLE 3 SUMMARY OF 'AIR TOXIC' EMISSIONS FROM KRAFT MILL BLEACH PLANTS, CONTD.

			EMISSIONS			
VOLATILE ORGANIC		MILL	RANGE	AVG	TEST	
COMPOUND		CODE	lb/ADTBP	lb/ADTBP	METHOD	COMMENTS
METHANOL		BPIC4		3.6E-01	HEATED CANISTER	FID, coelluted with ACETALDEHYDE
METHANOL		BPID	0.068 to 0.090	7.8E-02	HEATED CANISTER	FID
METHANOL		BPIE1	0.085 to 0.194	1.4E-01	HEATED CANISTER	FID
METHANOL		BPIE2	0.101 to 0.206	1.6E-01	HEATED CANISTER	FID
METHANOL		BPIF1	0.014 to 0.022	1.9E-02	HEATED CANISTER	FID
METHANOL		BPIF2	0.014 to 0.022	1.9E-02	HEATED CANISTER	FID
METHANOL		BPIG	0.013 to 0.122	8.6E-02	HEATED CANISTER	FID, coelluted with ACETALDEHYDE
METHANOL		BPIH1	0.048 to 0.117	8.3E-02	HEATED CANISTER	FID
METHANOL		BPIH2	0.126 to 0.178	1.5E-01	HEATED CANISTER	FID
METHANOL		BPII1	0.010 to 0.057	3.5E-02	HEATED CANISTER	FID
METHANOL		BPII2	0.135 to 0.218	1.8E-01	HEATED CANISTER	FID
METHANOL		BPIJ	0.060 to 0.098	7.8E-02	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
51	51		ND to 4.05	1.2E-01		
METHYL ETHYL	KETONE	BPA1	8.3E-5 to 8.0E-4	4.9E-04	NCASI & M0011	
METHYL ETHYL	KETONE	BPA2	0.0023 to 0.0031	2.7E-03	IMPINGER	NCASI METHOD
METHYL ETHYL	KETONE	BPB		ND[0.01]	IMPINGER	NCASI METHOD
METHYL ETHYL	KETONE	BPF	0.0003 to 0.0006	4.0E-04	IMPINGER	NCASI METHOD
METHYL ETHYL	KETONE	BPG	7.5E-4 to 1.4E-3	9.4E-04	VOST	
METHYL ETHYL	KETONE	BPH		ND[2.1E-04]	IMPINGER	NCASI METHOD
METHYL ETHYL	KETONE	BPI		ND [0.0054]	M18	
METHYL ETHYL	KETONE	BPJ		ND [0.0056]	M18	
METHYL ETHYL	KETONE	BPK1		ND [0.0044]	M18	
METHYL ETHYL	KETONE	BPK2		ND[0.0074]	M18	
METHYL ETHYL	KETONE	BPL1		ND[0.0032]	M18	
METHYL ETHYL	KETONE	BPL2		ND[0.004]	M18	
METHYL ETHYL	KETONE	BPL3		ND[0.008]	M18	
METHYL ETHYL	KETONE	BPMA1		6.9E-04	HEATED CANISTER	does not include DC & E tower vents
METHYL ETHYL	KETONE	BPMA2		1.1E-03	HEATED CANISTER	does not include DC tower vent
METHYL ETHYL	KETONE	BPMC1		1.2E-03	HEATED CANISTER	FID
METHYL ETHYL	KETONE	BPMC2		8.3E-04	HEATED CANISTER	FID
METHYL ETHYL	KETONE	BPME1		9.4E-04	HEATED CANISTER	FID
METHYL ETHYL	KETONE	BPME2		1.6E-03	HEATED CANISTER	FID
METHYL ETHYL	KETONE	BPME3		4.1E-04	HEATED CANISTER	FID
METHYL ETHYL	KETONE	BPMF1		2.7E-04	HEATED CANISTER	FID
METHYL ETHYL	KETONE	BPMF2		1.1E-03	HEATED CANISTER	FID
METHYL ETHYL	KETONE	BPMJ		4.9E-04	HEATED CANISTER	FID
METHYL ETHYL	KETONE	BPMK		3.6E-04	HEATED CANISTER	FID
METHYL ETHYL	KETONE	BPML		5.1E-04	HEATED CANISTER	FID
METHYL ETHYL	KETONE	BPMM1		1.1E-04	HEATED CANISTER	FID
METHYL ETHYL	KETONE	BPMM2		1.4E-03	HEATED CANISTER	FID
METHYL ETHYL	KETONE	BPMN		ND[2.1E-04]	HEATED CANISTER	FID
METHYL ETHYL	KETONE	BPIA1		ND[1.1E-02]	HEATED CANISTER	FID, 1.4E-03 by DNPH
METHYL ETHYL	KETONE	BPIA2		ND[2.5E-02]	HEATED CANISTER	FID, 2.9E-03 by DNPH
METHYL ETHYL	KETONE	BPIB		ND[1.2E-02]	HEATED CANISTER	FID, 1.0E-02 by DNPH
METHYL ETHYL	KETONE	BPIC1		ND[6.9E-03]	HEATED CANISTER	FID, 8.3E-04 by DNPH
METHYL ETHYL	KETONE	BPIC2		5.5E-04	IMPINGER	DNPH
METHYL ETHYL	KETONE	BPID		ND[4.1E-03]	HEATED CANISTER	FID, 1.9E-04 by DNPH
METHYL ETHYL	KETONE	BPIE1	ND to 0.010	4.9E-03	HEATED CANISTER	FID, ND[2.4E-04] by DNPH
METHYL ETHYL	KETONE	BPIE2	ND to 0.010	5.1E-03	HEATED CANISTER	FID, ND[2.4E-04] by DNPH
METHYL ETHYL	KETONE	BPIF1	ND to 0.021	1.1E-02	HEATED CANISTER	FID, 2.0E-04 by DNPH
METHYL ETHYL	KETONE	BPIF2	ND to 0.013	6.6E-03	HEATED CANISTER	FID, 1.6E-04 by DNPH
METHYL ETHYL	KETONE	BPIG		ND[4.6E-03]	HEATED CANISTER	FID, ND[2.1E-04] by DNPH
METHYL ETHYL	KETONE	BPIH1		ND[1.3E-02]	HEATED CANISTER	FID, 1.1E-02 by DNPH
METHYL ETHYL	KETONE	BPIH2		ND[1.1E-02]	HEATED CANISTER	FID, 5.0E-03 by DNPH
METHYL ETHYL	KETONE	BPII1		ND[5.6E-03]	HEATED CANISTER	FID
METHYL ETHYL	KETONE	BPII2		ND[1.1E-02]	HEATED CANISTER	FID
METHYL ETHYL	KETONE	BPIJ		ND[4.0E-03]	HEATED CANISTER	FID, 6.4E-03 by DNPH
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
44	23		ND to 2.1E-02	1.9E-04		

TABLE 3 SUMMARY OF "AIR TOXIC" EMISSIONS FROM KRAFT MILL BLEACH PLANTS, CONTD.

VOLATILE ORGANIC COMPOUND	MILL CODE	EMISSIONS RANGE lb/ADTBP	EMISSIONS AVG lb/ADTBP	TEST METHOD	COMMENTS
METHYL ISOBUTYL KETONE	BPMA1		2.1E-04	HEATED CANISTER	does not include DC & E tower vents
METHYL ISOBUTYL KETONE	BPMA2		2.1E-04	HEATED CANISTER	does not include DC tower vent
METHYL ISOBUTYL KETONE	BPMC1		2.9E-04	HEATED CANISTER	FID
METHYL ISOBUTYL KETONE	BPMC2		2.1E-04	HEATED CANISTER	FID
METHYL ISOBUTYL KETONE	BPME1		4.5E-04	HEATED CANISTER	FID
METHYL ISOBUTYL KETONE	BPME2		3.2E-03	HEATED CANISTER	FID
METHYL ISOBUTYL KETONE	BPME3		1.4E-04	HEATED CANISTER	FID
METHYL ISOBUTYL KETONE	BPMF1		1.4E-04	HEATED CANISTER	FID
METHYL ISOBUTYL KETONE	BPMF2		2.7E-04	HEATED CANISTER	FID
METHYL ISOBUTYL KETONE	BPMJ		2.9E-05	HEATED CANISTER	FID
METHYL ISOBUTYL KETONE	BPMK		ND[4.7E-05]	HEATED CANISTER	FID
METHYL ISOBUTYL KETONE	BPML		ND[6.5E-05]	HEATED CANISTER	FID
METHYL ISOBUTYL KETONE	BPMM1		ND[1.7E-05]	HEATED CANISTER	FID
METHYL ISOBUTYL KETONE	BPMM2		2.7E-04	HEATED CANISTER	FID
METHYL ISOBUTYL KETONE	BPMN		ND[7.3E-05]	HEATED CANISTER	FID
METHYL ISOBUTYL KETONE	BPIA1		ND[1.5E-02]	HEATED CANISTER	FID, ND[2.1E-04] by DNPH
METHYL ISOBUTYL KETONE	BPIA2		ND[3.5E-02]	HEATED CANISTER	FID, ND[5.2E-04] by DNPH
METHYL ISOBUTYL KETONE	BPIB		ND[1.7E-02]	HEATED CANISTER	FID, 3.0E-03 by DNPH
METHYL ISOBUTYL KETONE	BPIC1		ND[9.6E-03]	HEATED CANISTER	FID, 1.2E-03 by DNPH
METHYL ISOBUTYL KETONE	BPID		ND[5.7E-03]	HEATED CANISTER	FDI, ND[3.2E-04] by DNPH
METHYL ISOBUTYL KETONE	BPIE1		ND[1.3E-02]	HEATED CANISTER	FID, ND[3.4E-04] by DNPH
METHYL ISOBUTYL KETONE	BPIE2		ND[1.4E-02]	HEATED CANISTER	FID, ND[3.4E-04] by DNPH
METHYL ISOBUTYL KETONE	BPIF1		ND[2.9E-02]	HEATED CANISTER	FID, 8.2E-04 by DNPH
METHYL ISOBUTYL KETONE	BPIF2		ND[1.8E-02]	HEATED CANISTER	FID, 2.8E-04 by DNPH
METHYL ISOBUTYL KETONE	BPIG		ND[8.4E-03]	HEATED CANISTER	FID, ND[2.1E-04] by DNPH
METHYL ISOBUTYL KETONE	BPIH1		ND[1.9E-02]	HEATED CANISTER	FID, ND[3.2E-04] by DNPH
METHYL ISOBUTYL KETONE	BPIH2		ND[1.5E-02]	HEATED CANISTER	FID, ND[2.1E-04] by DNPH
METHYL ISOBUTYL KETONE	BPII1		ND[7.8E-03]	HEATED CANISTER	FID
METHYL ISOBUTYL KETONE	BPII2		ND[1.6E-02]	HEATED CANISTER	FID
METHYL ISOBUTYL KETONE	BPIJ		ND[5.6E-03]	HEATED CANISTER	FID, 2.0E-04 by DNPH
NO. OF TESTS	DETECTS	RANGE	MEDIAN*		
30	11	ND to 3.2E-03	3.6E-05		
METHYL MERCAPTAN	BPME1		3.8E-02	HEATED CANISTER	FID, U
METHYL MERCAPTAN	BPME2		ND[5.3E-03]	HEATED CANISTER	FID
METHYL MERCAPTAN	BPME3		ND[6.0E-03]	HEATED CANISTER	FID
METHYL MERCAPTAN	BPMF1		2.8E-03	HEATED CANISTER	FID
METHYL MERCAPTAN	BPMF2		1.4E-02	HEATED CANISTER	FID, U
METHYL MERCAPTAN	BPMJ		ND[6.9E-04]	HEATED CANISTER	FID
METHYL MERCAPTAN	BPMK		ND[1.0E-03]	HEATED CANISTER	FID
METHYL MERCAPTAN	BPML		ND[1.4E-03]	HEATED CANISTER	FID
METHYL MERCAPTAN	BPMM1		ND[3.6E-04]	HEATED CANISTER	FID
METHYL MERCAPTAN	BPMM2		ND[8.8E-03]	HEATED CANISTER	FID
METHYL MERCAPTAN	BPMN		1.3E-02	HEATED CANISTER	FID, U
METHYL MERCAPTAN	BPIA1		ND[7.1E-03]	HEATED CANISTER	FID
METHYL MERCAPTAN	BPIA2		ND[1.7E-02]	HEATED CANISTER	FID
METHYL MERCAPTAN	BPIB		ND[8.0E-03]	HEATED CANISTER	FID
METHYL MERCAPTAN	BPIC1		ND[4.7E-03]	HEATED CANISTER	FID
METHYL MERCAPTAN	BPID	0.025 to 0.031	2.7E-02	HEATED CANISTER	FID
METHYL MERCAPTAN	BPIE1	0.010 to 0.013	1.1E-02	HEATED CANISTER	FID
METHYL MERCAPTAN	BPIE2	0.011 to 0.013	1.1E-02	HEATED CANISTER	FID
METHYL MERCAPTAN	BPIF1		ND[1.4E-02]	HEATED CANISTER	FID
METHYL MERCAPTAN	BPIF2		ND[8.6E-03]	HEATED CANISTER	FID
METHYL MERCAPTAN	BPIG	0.028 to 0.041	3.5E-02	HEATED CANISTER	FID
METHYL MERCAPTAN	BPIH1		ND[8.9E-03]	HEATED CANISTER	FID
METHYL MERCAPTAN	BPIH2		ND[7.0E-03]	HEATED CANISTER	FID
METHYL MERCAPTAN	BPII1	ND to 0.004	2.8E-03	HEATED CANISTER	FID
METHYL MERCAPTAN	BPII2	ND to 0.010	7.5E-03	HEATED CANISTER	FID
METHYL MERCAPTAN	BPIJ	ND to 0.003	1.9E-03	HEATED CANISTER	FID
NO. OF TESTS	DETECTS	RANGE	MEDIAN*		
26	11	ND to 4.1E-02	1.8E-03		

TABLE 3 SUMMARY OF 'AIR TOXIC' EMISSIONS FROM KRAFT MILL BLEACH PLANTS, CONTD.

VOLATILE ORGANIC COMPOUND		MILL CODE	EMISSIONS RANGE lb/ADTBP	EMISSIONS AVG lb/ADTBP	TEST METHOD	COMMENTS
METHYLENE CHLORIDE		BPC1a	19 to 57 ug/m3	3.4E-05	VOST	
METHYLENE CHLORIDE		BPC1b	120-1060 ug/m3	1.1E-03	CARB 422	
METHYLENE CHLORIDE		BPDa	4.3 to 11 ug/m3	7.8E-05	VOST	
METHYLENE CHLORIDE		BPDb		ND[5.0E-03]	CARB 422	
METHYLENE CHLORIDE		BPG	3.7E-4 to 4.1E-3	1.4E-03	VOST	
METHYLENE CHLORIDE		BPL1		ND[0.0032]	M18	
METHYLENE CHLORIDE		BPL2		ND[0.004]	M18	
METHYLENE CHLORIDE		BPL3		ND[0.008]	M18	
METHYLENE CHLORIDE		BPM		ND[0.003]	M18	
METHYLENE CHLORIDE		BPMA1		ND[1.7E-03]	HEATED CANISTER	does not include DC & E tower vents
METHYLENE CHLORIDE		BPMA2		6.6E-04	HEATED CANISTER	does not include DC tower vent
METHYLENE CHLORIDE		BPMC1		ND[1.1E-03]	HEATED CANISTER	FID
METHYLENE CHLORIDE		BPMC2		6.7E-04	HEATED CANISTER	FID
METHYLENE CHLORIDE		BPME1		ND[2.1E-03]	HEATED CANISTER	FID
METHYLENE CHLORIDE		BPME2		ND[1.9E-03]	HEATED CANISTER	FID
METHYLENE CHLORIDE		BPME3		ND[2.1E-03]	HEATED CANISTER	FID
METHYLENE CHLORIDE		BPMF1		ND[1.0E-03]	HEATED CANISTER	FID
METHYLENE CHLORIDE		BPMF2		1.4E-03	HEATED CANISTER	FID
METHYLENE CHLORIDE		BPMJ		1.7E-04	HEATED CANISTER	FID
METHYLENE CHLORIDE		BPMK		2.7E-04	HEATED CANISTER	FID
METHYLENE CHLORIDE		BPML		ND[4.9E-04]	HEATED CANISTER	FID
METHYLENE CHLORIDE		BPMM1		ND[1.3E-04]	HEATED CANISTER	FID
METHYLENE CHLORIDE		BPMM2		5.6E-03	HEATED CANISTER	FID
METHYLENE CHLORIDE		BPMN		ND[5.5E-04]	HEATED CANISTER	FID
METHYLENE CHLORIDE		BPIA1		ND[1.3E-02]	HEATED CANISTER	FID
METHYLENE CHLORIDE		BPIA2		ND[2.9E-02]	HEATED CANISTER	FID
METHYLENE CHLORIDE		BPIB		ND[1.4E-02]	HEATED CANISTER	FID
METHYLENE CHLORIDE		BPIC1		ND[8.1E-03]	HEATED CANISTER	FID
METHYLENE CHLORIDE		BPID		ND[4.9E-03]	HEATED CANISTER	FID
METHYLENE CHLORIDE		BPIE1	0.005 to 0.011	5.9E-03	HEATED CANISTER	FID
METHYLENE CHLORIDE		BPIE2	0.006 to 0.012	6.7E-03	HEATED CANISTER	FID
METHYLENE CHLORIDE		BPIF1	0.013 to 0.025	1.3E-02	HEATED CANISTER	FID
METHYLENE CHLORIDE		BPIF2	0.007 to 0.015	8.0E-03	HEATED CANISTER	FID
METHYLENE CHLORIDE		BPIG		ND[5.3E-03]	HEATED CANISTER	FID
METHYLENE CHLORIDE		BPIH1		ND[1.6E-02]	HEATED CANISTER	FID
METHYLENE CHLORIDE		BPIH2		ND[1.2E-02]	HEATED CANISTER	FID
METHYLENE CHLORIDE		BPII1		ND[6.7E-03]	HEATED CANISTER	FID
METHYLENE CHLORIDE		BPII2		ND[1.3E-02]	HEATED CANISTER	FID
METHYLENE CHLORIDE		BPIJ	ND to 0.007	3.8E-03	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN*		
39	15		ND to 2.5E-02	5.8E-05		
PHENOL		BPIA1		ND[1.4E-02]	HEATED CANISTER	FID
PHENOL		BPIA2		ND[3.2E-02]	HEATED CANISTER	FID
PHENOL		BPIB		ND[1.6E-02]	HEATED CANISTER	FID
PHENOL		BPIC1		ND[9.0E-03]	HEATED CANISTER	FID
PHENOL		BPIC2		6.1E-03	HEATED CANISTER	FID
PHENOL		BPIC4		1.5E-02	HEATED CANISTER	FID
PHENOL		BPID		ND[5.4E-03]	HEATED CANISTER	FID
PHENOL		BPIE1		ND[1.2E-02]	HEATED CANISTER	FID
PHENOL		BPIE2	0.008 to 0.055	2.3E-02	HEATED CANISTER	FID
PHENOL		BPIF1		ND[2.7E-02]	HEATED CANISTER	FID
PHENOL		BPIF2		ND[1.7E-02]	HEATED CANISTER	FID
PHENOL		BPIG		ND[5.9E-03]	HEATED CANISTER	FID
PHENOL		BPIH1		ND[1.8E-02]	HEATED CANISTER	FID
PHENOL		BPIH2		ND[1.4E-02]	HEATED CANISTER	FID
PHENOL		BPII1		ND[7.3E-03]	HEATED CANISTER	FID
PHENOL		BPII2		ND[1.5E-02]	HEATED CANISTER	FID
PHENOL		BPIJ		ND[5.3E-03]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN*		
17	3		ND to 5.5E-02	2.8E-04		

TABLE 3 SUMMARY OF 'AIR TOXIC' EMISSIONS FROM KRAFT MILL BLEACH PLANTS CONTD.

VOLATILE ORGANIC COMPOUND		MILL CODE	EMISSIONS RANGE lb/ADTBP	AVG lb/ADTBP	TEST METHOD	COMMENTS
ALPHA-PINENE		BPA1		ND[6.5E-6]	M0010	
ALPHA-PINENE		BPG	1.58E-03 lb/hr	1.6E-04	VOST	
ALPHA-PINENE		BPI	ND to 0.0063	2.7E-03	M18	
ALPHA-PINENE		BPJ	ND to 0.075	4.2E-02	M18	
ALPHA-PINENE		BPK1		ND [0.004]	M18	
ALPHA-PINENE		BPK2		ND [0.007]	M18	
ALPHA-PINENE		BPL1		ND[0.003]	M18	
ALPHA-PINENE		BPL2		ND[0.004]	M18	
ALPHA-PINENE		BPL3		ND[0.006]	M18	
ALPHA-PINENE		BPMA1		7.3E-04	HEATED CANISTER	does not include DC & E tower vents
ALPHA-PINENE		BPMA2		1.8E-03	HEATED CANISTER	does not include DC tower vent
ALPHA-PINENE		BPMC1		2.0E-03	HEATED CANISTER	FID
ALPHA-PINENE		BPMC2		3.8E-03	HEATED CANISTER	FID
ALPHA-PINENE		BPME1		4.7E-04	HEATED CANISTER	FID
ALPHA-PINENE		BPME2		ND[3.0E-04]	HEATED CANISTER	FID
ALPHA-PINENE		BPME3		1.8E-04	HEATED CANISTER	FID
ALPHA-PINENE		BPIC1		ND[1.5E-02]	HEATED CANISTER	FID
ALPHA-PINENE		BPIC2		1.6E-03	HEATED CANISTER	FID
ALPHA-PINENE		BPIC3		2.0E-02	HEATED CANISTER	FID
ALPHA-PINENE		BPIC4		1.9E-01	HEATED CANISTER	FID
ALPHA-PINENE		BPIF1		ND[3.9E-02]	HEATED CANISTER	FID
ALPHA-PINENE		BPIF2		ND[2.4E-02]	HEATED CANISTER	FID
ALPHA-PINENE		BPIG		ND[8.6E-03]	HEATED CANISTER	FID
ALPHA-PINENE		BPII1		ND[1.1E-02]	HEATED CANISTER	FID
ALPHA-PINENE		BPII2	ND to 0.065	3.5E-02	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
25	13		ND to 1.9E-01	1.6E-04		
BETA-PINENE		BPA1		ND[2.1E-6]	SEMI-VOST	
BETA-PINENE		BPG	0.0 to 2.0E-4	6.6E-05	VOST	
BETA-PINENE		BPI		ND[0.006]	M18	
BETA-PINENE		BPJ	ND to 0.068	3.5E-02	M18	
BETA-PINENE		BPK1		ND[0.0044]	M18	
BETA-PINENE		BPK2		ND[0.0074]	M18	
BETA-PINENE		BPL1		ND[0.0032]	M18	
BETA-PINENE		BPL2		ND[0.004]	M18	
BETA-PINENE		BPL3		ND[0.006]	M18	
BETA-PINENE		BPMA2		9.6E-05	HEATED CANISTER	does not include DC tower vent
BETA-PINENE		BPMC1		1.0E-02	HEATED CANISTER	FID
BETA-PINENE		BPMC2		5.7E-03	HEATED CANISTER	FID
BETA-PINENE		BPME1		2.2E-04	HEATED CANISTER	FID
BETA-PINENE		BPME2		1.5E-04	HEATED CANISTER	FID
BETA-PINENE		BPME3		1.7E-04	HEATED CANISTER	FID
BETA-PINENE		BPIC1		ND[1.5E-02]	HEATED CANISTER	FID
BETA-PINENE		BPIC2		8.8E-03	HEATED CANISTER	FID
BETA-PINENE		BPIC4		4.7E-02	HEATED CANISTER	FID
BETA-PINENE		BPIF1		ND[3.9E-02]	HEATED CANISTER	FID
BETA-PINENE		BPIF2		ND[2.4E-02]	HEATED CANISTER	FID
BETA-PINENE		BPIG		ND[8.6E-03]	HEATED CANISTER	FID
BETA-PINENE		BPII1		ND[1.1E-02]	HEATED CANISTER	FID
BETA-PINENE		BPII2		ND[2.2E-02]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
23	10		ND to 6.8E-02	2.8E-05		
PROPIONALDEHYDE		BPIA1	0.00024 to 0.00076	5.7E-04	IMPINGER	DNPH
PROPIONALDEHYDE		BPIA2	ND to 0.00046	3.8E-04	IMPINGER	DNPH
PROPIONALDEHYDE		BPIB	0.0021 to 0.0031	2.5E-03	IMPINGER	DNPH
PROPIONALDEHYDE		BPID	0.00038 to 0.00073	5.2E-04	IMPINGER	DNPH

TABLE 3 SUMMARY OF 'AIR TOXIC' EMISSIONS FROM KRAFT MILL BLEACH PLANTS, CONTD.

			EMISSIONS			
VOLATILE ORGANIC		MILL	RANGE	AVG	TEST	
COMPOUND		CODE	lb/ADTBP	lb/ADTBP	METHOD	COMMENTS
PROPIONALDEHYDE		BPIG	0.0028 to 0.0057	3.9E-03	IMPINGER	DNPH
PROPIONALDEHYDE		BPIH1		ND[3.0E-04]	IMPINGER	DNPH
PROPIONALDEHYDE		BPIH2	ND to 0.00028	1.6E-04	IMPINGER	DNPH
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
7	6		ND to 5.7E-03	5.2E-04		
STYRENE		BPG		ND[1.6E-04]	VOST	
STYRENE		BPMA1		ND[2.1E-04]	HEATED CANISTER	does not include DC & E tower vents
STYRENE		BPMA2		ND[8.9E-05]	HEATED CANISTER	does not include DC tower vent
STYRENE		BPMC1		4.9E-04	HEATED CANISTER	FID
STYRENE		BPMC2		5.9E-04	HEATED CANISTER	FID
STYRENE		BPME1		3.5E-04	HEATED CANISTER	FID
STYRENE		BPME2		1.2E-03	HEATED CANISTER	FID
STYRENE		BPME3		3.4E-04	HEATED CANISTER	FID
STYRENE		BPMF1		7.5E-05	HEATED CANISTER	FID
STYRENE		BPMF2		3.3E-04	HEATED CANISTER	FID
STYRENE		BPMJ		2.2E-04	HEATED CANISTER	FID
STYRENE		BPMK		ND[4.4E-05]	HEATED CANISTER	FID
STYRENE		BPML		1.2E-04	HEATED CANISTER	FID
STYRENE		BPMM1		ND[1.6E-05]	HEATED CANISTER	FID
STYRENE		BPMM2		2.7E-04	HEATED CANISTER	FID
STYRENE		BPMN		3.6E-05	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
16	11		ND to 1.2E-03	2.2E-04		
TERPENES		BPMF1		6.0E-03	HEATED CANISTER	FID
TERPENES		BPMF2		4.4E-02	HEATED CANISTER	FID
TERPENES		BPMJ		3.4E-03	HEATED CANISTER	FID
TERPENES		BPMK		8.8E-03	HEATED CANISTER	FID
TERPENES		BPML		2.8E-03	HEATED CANISTER	FID
TERPENES		BPMM1		4.5E-04	HEATED CANISTER	FID
TERPENES		BPMM2		2.5E-02	HEATED CANISTER	FID
TERPENES		BPMN		2.8E-03	HEATED CANISTER	FID
TERPENES		BPIA1	0.044 to 0.235	1.5E-01	HEATED CANISTER	FID
TERPENES		BPIA2		ND[4.7E-02]	HEATED CANISTER	FID
TERPENES		BPIB		ND[2.3E-02]	HEATED CANISTER	FID
TERPENES		BPID		ND[7.7E-03]	HEATED CANISTER	FID
TERPENES		BPIE1	0.022 to 0.047	3.0E-02	HEATED CANISTER	FID
TERPENES		BPIE2	0.017 to 0.035	2.2E-02	HEATED CANISTER	FID
TERPENES		BPIF1	0.028 to 0.055	3.2E-02	HEATED CANISTER	FID
TERPENES		BPIF2	0.021 to 0.039	2.4E-02	HEATED CANISTER	FID
TERPENES		BPIH1		ND[2.5E-02]	HEATED CANISTER	FID
TERPENES		BPIH2		ND[2.0E-02]	HEATED CANISTER	FID
TERPENES		BPIJ		ND[7.6E-03]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
19	13		ND to 2.4E-01	2.8E-03		
ALPHA- TERPINEOL		BPII1		ND[1.2E-02]	HEATED CANISTER	FID
ALPHA- TERPINEOL		BPII2		ND[2.4E-02]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
2	0		ND	ND		
TETRACHLOROETHYLENE		BPMA1		ND[9.8E-04]	HEATED CANISTER	does not include DC & E tower vents
TETRACHLOROETHYLENE		BPMA2		ND[4.3E-04]	HEATED CANISTER	does not include DC tower vent
TETRACHLOROETHYLENE		BPMC1		3.3E-04	HEATED CANISTER	FID
TETRACHLOROETHYLENE		BPMC2		3.9E-04	HEATED CANISTER	FID

TABLE 3 SUMMARY OF 'AIR TOXIC' EMISSIONS FROM KRAFT MILL BLEACH PLANTS, CONTD.

		EMISSIONS			
VOLATILE ORGANIC COMPOUND	MILL CODE	RANGE lb/ADTBP	AVG lb/ADTBP	TEST METHOD	COMMENTS
TETRACHLOROETHYLENE	BPME1		ND[1.2E-05]	HEATED CANISTER	FID
TETRACHLOROETHYLENE	BPME2		ND[1.1E-05]	HEATED CANISTER	FID
TETRACHLOROETHYLENE	BPME3		6.2E-04	HEATED CANISTER	FID
TETRACHLOROETHYLENE	BPMF1		ND[6.0E-04]	HEATED CANISTER	FID
TETRACHLOROETHYLENE	BPMF2		6.7E-04	HEATED CANISTER	FID
TETRACHLOROETHYLENE	BPMJ		ND[1.4E-04]	HEATED CANISTER	FID
TETRACHLOROETHYLENE	BPMK		2.8E-04	HEATED CANISTER	FID
TETRACHLOROETHYLENE	BPML		ND[2.8E-04]	HEATED CANISTER	FID
TETRACHLOROETHYLENE	BPMM1		ND[7.7E-05]	HEATED CANISTER	FID
TETRACHLOROETHYLENE	BPMM2		8.5E-03	HEATED CANISTER	FID
TETRACHLOROETHYLENE	BPMN		ND[3.2E-04]	HEATED CANISTER	FID
NO. OF TESTS / DETECTS		RANGE	MEDIAN		
15 / 6		ND to 8.5E-03	9.1E-05		
TOLUENE	BPG	6.8E-6 to 1.5E-4	3.6E-05	VOST	
TOLUENE	BPI		ND [0.0054]	M18	
TOLUENE	BPJ		ND [0.0056]	M18	
TOLUENE	BPK1		ND [0.0044]	M18	
TOLUENE	BPK2	3.7E-5 to 7.9E-5	5.8E-05	M18	
TOLUENE	BPL1		ND[0.0032]	M18	
TOLUENE	BPL2		ND[0.004]	M18	
TOLUENE	BPL3		ND[0.008]	M18	
TOLUENE	BPMA1		ND[1.8E-04]	HEATED CANISTER	does not include DC & E tower vents
TOLUENE	BPMA2		9.2E-05	HEATED CANISTER	does not include DC tower vent
TOLUENE	BPMC1		9.6E-05	HEATED CANISTER	FID
TOLUENE	BPMC2		6.4E-04	HEATED CANISTER	FID
TOLUENE	BPME1		1.7E-04	HEATED CANISTER	FID
TOLUENE	BPME2		ND[2.0E-04]	HEATED CANISTER	FID
TOLUENE	BPME3		1.1E-04	HEATED CANISTER	FID
TOLUENE	BPMF1		9.5E-05	HEATED CANISTER	FID
TOLUENE	BPMF2		1.6E-04	HEATED CANISTER	FID
TOLUENE	BPMJ		2.4E-04	HEATED CANISTER	FID
TOLUENE	BPMK		ND[3.9E-05]	HEATED CANISTER	FID
TOLUENE	BPML		ND[5.3E-05]	HEATED CANISTER	FID
TOLUENE	BPMM1		2.0E-05	HEATED CANISTER	FID
TOLUENE	BPMM2		2.9E-04	HEATED CANISTER	FID
TOLUENE	BPMN		ND[5.9E-05]	HEATED CANISTER	FID
TOLUENE	BPIA1		ND[1.4E-02]	HEATED CANISTER	FID
TOLUENE	BPIA2		ND[3.2E-02]	HEATED CANISTER	FID
TOLUENE	BPIB		ND[1.5E-02]	HEATED CANISTER	FID
TOLUENE	BPIC1		ND[8.9E-03]	HEATED CANISTER	FID
TOLUENE	BPID		ND[5.3E-03]	HEATED CANISTER	FID
TOLUENE	BPIE1		ND[1.2E-02]	HEATED CANISTER	FID
TOLUENE	BPIE2		ND[1.3E-02]	HEATED CANISTER	FID
TOLUENE	BPIF1		ND[2.7E-02]	HEATED CANISTER	FID
TOLUENE	BPIF2		ND[1.6E-02]	HEATED CANISTER	FID
TOLUENE	BPIG		ND[5.8E-03]	HEATED CANISTER	FID
TOLUENE	BPIH1		ND[1.7E-02]	HEATED CANISTER	FID
TOLUENE	BPIH2		ND[1.3E-02]	HEATED CANISTER	FID
TOLUENE	BPII1		ND[7.2E-03]	HEATED CANISTER	FID
TOLUENE	BPII2		ND[1.5E-02]	HEATED CANISTER	FID
TOLUENE	BPIJ		ND[5.2E-03]	HEATED CANISTER	FID
NO. OF TESTS / DETECTS		RANGE	MEDIAN		
38 / 12		ND to 6.4E-04	1.6E-05		
1,2,4-TRICHLOROBENZENE	BPMA1		4.7E-04	HEATED CANISTER	does not include DC & E tower vents
1,2,4-TRICHLOROBENZENE	BPMA2		2.8E-04	HEATED CANISTER	does not include DC tower vent
1,2,4-TRICHLOROBENZENE	BPMC1		ND[2.4E-04]	HEATED CANISTER	FID
1,2,4-TRICHLOROBENZENE	BPMC2		ND[2.9E-04]	HEATED CANISTER	FID
1,2,4-TRICHLOROBENZENE	BPME1		5.0E-04	HEATED CANISTER	FID

TABLE 3 SUMMARY OF 'AIR TOXIC' EMISSIONS FROM KRAFT MILL BLEACH PLANTS, CONTD.

			EMISSIONS			
VOLATILE ORGANIC		MILL	RANGE	AVG	TEST	
COMPOUND		CODE	lb/ADTBP	lb/ADTBP	METHOD	COMMENTS
1,2,4-TRICHLOROBENZENE		BPME2		5.0E-03	HEATED CANISTER	FID
1,2,4-TRICHLOROBENZENE		BPME3		ND[4.5E-04]	HEATED CANISTER	FID
1,2,4-TRICHLOROBENZENE		BPMF1		7.0E-03	HEATED CANISTER	FID
1,2,4-TRICHLOROBENZENE		BPMF2		2.2E-02	HEATED CANISTER	FID
1,2,4-TRICHLOROBENZENE		BPMJ		ND[5.2E-5]	HEATED CANISTER	FID
1,2,4-TRICHLOROBENZENE		BPMK		ND[7.6E-05]	HEATED CANISTER	FID
1,2,4-TRICHLOROBENZENE		BPML		ND[1.0E-04]	HEATED CANISTER	FID
1,2,4-TRICHLOROBENZENE		BPMM1		ND[2.7E-05]	HEATED CANISTER	FID
1,2,4-TRICHLOROBENZENE		BPMM2		ND[6.6E-04]	HEATED CANISTER	FID
1,2,4-TRICHLOROBENZENE		BPMN		ND[1.2E-04]	HEATED CANISTER	FID
1,2,4-TRICHLOROBENZENE		BPII1		ND[1.4E-02]	HEATED CANISTER	FID
1,2,4-TRICHLOROBENZENE		BPII2		ND[2.9E-02]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN*		
17	6		ND to 2.2E-02	6.0E-05		
1,1,1-TRICHLOROETHANE		BPC1b	<20.8-88.7 ug/m3	2.0E-04	CARB 422	
1,1,1-TRICHLOROETHANE		BPDb		ND[7.2E-04]	CARB 422	
1,1,1-TRICHLOROETHANE		BPG	-	1.1E-04	VOST	
1,1,1-TRICHLOROETHANE		BPL1		ND[0.0032]	M18	
1,1,1-TRICHLOROETHANE		BPL2		ND[0.0044]	M18	
1,1,1-TRICHLOROETHANE		BPL3		ND[0.008]	M18	
1,1,1-TRICHLOROETHANE		BPM		ND[0.006]	M18	
1,1,1-TRICHLOROETHANE		BPMC1		ND[5.3E-04]	HEATED CANISTER	FID
1,1,1-TRICHLOROETHANE		BPMC2		ND[6.2E-04]	HEATED CANISTER	FID
1,1,1-TRICHLOROETHANE		BPME1		ND[9.7E-04]	HEATED CANISTER	FID
1,1,1-TRICHLOROETHANE		BPME2		ND[8.8E-04]	HEATED CANISTER	FID
1,1,1-TRICHLOROETHANE		BPME3		5.0E-04	HEATED CANISTER	FID
1,1,1-TRICHLOROETHANE		BPMF1		ND[4.9E-04]	HEATED CANISTER	FID
1,1,1-TRICHLOROETHANE		BPMF2		5.4E-04	HEATED CANISTER	FID
1,1,1-TRICHLOROETHANE		BPMJ		ND[1.2E-04]	HEATED CANISTER	FID
1,1,1-TRICHLOROETHANE		BPMK		ND[1.7E-04]	HEATED CANISTER	FID
1,1,1-TRICHLOROETHANE		BPML		ND[2.3E-04]	HEATED CANISTER	FID
1,1,1-TRICHLOROETHANE		BPMM1		ND[6.0E-05]	HEATED CANISTER	FID
1,1,1-TRICHLOROETHANE		BPMM2		ND[1.5E-03]	HEATED CANISTER	FID
1,1,1-TRICHLOROETHANE		BPMN		ND[2.6E-04]	HEATED CANISTER	FID
1,1,1-TRICHLOROETHANE		BPIA1		ND[2.0E-02]	HEATED CANISTER	FID
1,1,1-TRICHLOROETHANE		BPIA2		ND[4.6E-02]	HEATED CANISTER	FID
1,1,1-TRICHLOROETHANE		BPIB		ND[2.2E-02]	HEATED CANISTER	FID
1,1,1-TRICHLOROETHANE		BPIC1		ND[1.3E-02]	HEATED CANISTER	FID
1,1,1-TRICHLOROETHANE		BPID		ND[7.6E-03]	HEATED CANISTER	FID
1,1,1-TRICHLOROETHANE		BPIE1		ND[1.7E-02]	HEATED CANISTER	FID
1,1,1-TRICHLOROETHANE		BPIE2		ND[1.8E-02]	HEATED CANISTER	FID
1,1,1-TRICHLOROETHANE		BPIF1		ND[3.9E-02]	HEATED CANISTER	FID
1,1,1-TRICHLOROETHANE		BPIF2		ND[2.4E-02]	HEATED CANISTER	FID
1,1,1-TRICHLOROETHANE		BPIG		ND[8.4E-03]	HEATED CANISTER	FID
1,1,1-TRICHLOROETHANE		BPIH1		ND[2.5E-02]	HEATED CANISTER	FID
1,1,1-TRICHLOROETHANE		BPIH2		ND[1.9E-02]	HEATED CANISTER	FID
1,1,1-TRICHLOROETHANE		BPII1		ND[2.1E-02]	HEATED CANISTER	FID
1,1,1-TRICHLOROETHANE		BPII2		ND[4.2E-02]	HEATED CANISTER	FID
1,1,1-TRICHLOROETHANE		BPIJ		ND[7.5E-03]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN*		
35	4		ND to 5.4E-04	1.3E-05		
1,1,2-TRICHLOROETHANE		BPG		ND[1.2E-04]	VOST	
1,1,2-TRICHLOROETHANE		BPMA1		ND[7.9E-04]	HEATED CANISTER	does not include DC & E tower vents
1,1,2-TRICHLOROETHANE		BPMA2		2.3E-04	HEATED CANISTER	does not include DC tower vent
1,1,2-TRICHLOROETHANE		BPMC1		ND[5.3E-04]	HEATED CANISTER	FID
1,1,2-TRICHLOROETHANE		BPMC2		ND[6.2E-04]	HEATED CANISTER	FID
1,1,2-TRICHLOROETHANE		BPME1		ND[9.7E-04]	HEATED CANISTER	FID
1,1,2-TRICHLOROETHANE		BPME2		ND[8.8E-04]	HEATED CANISTER	FID

TABLE 3 SUMMARY OF 'AIR TOXIC' EMISSIONS FROM KRAFT MILL BLEACH PLANTS, CONTD.

VOLATILE ORGANIC COMPOUND		MILL CODE	EMISSIONS RANGE lb/ADTBP	EMISSIONS AVG lb/ADTBP	TEST METHOD	COMMENTS
1,1,2-TRICHLOROETHANE		BPME3		ND[8.8E-04]	HEATED CANISTER	FID
1,1,2-TRICHLOROETHANE		BPMF1		ND[4.8E-04]	HEATED CANISTER	FID
1,1,2-TRICHLOROETHANE		BPMF2		5.5E-04	HEATED CANISTER	FID
1,1,2-TRICHLOROETHANE		BPMJ		ND[1.2E-04]	HEATED CANISTER	FID
1,1,2-TRICHLOROETHANE		BPMK		ND[1.7E-04]	HEATED CANISTER	FID
1,1,2-TRICHLOROETHANE		BPML		ND[2.3E-04]	HEATED CANISTER	FID
1,1,2-TRICHLOROETHANE		BPMM1		ND[6.0E-05]	HEATED CANISTER	FID
1,1,2-TRICHLOROETHANE		BPMM2		ND[1.5E-03]	HEATED CANISTER	FID
1,1,2-TRICHLOROETHANE		BPMN		ND[2.6E-04]	HEATED CANISTER	FID
1,1,2-TRICHLOROETHANE		BPIA1		ND[2.0E-02]	HEATED CANISTER	FID
1,1,2-TRICHLOROETHANE		BPIA2		ND[4.6E-02]	HEATED CANISTER	FID
1,1,2-TRICHLOROETHANE		BPIB		ND[2.2E-02]	HEATED CANISTER	FID
1,1,2-TRICHLOROETHANE		BPIC1		ND[1.3E-02]	HEATED CANISTER	FID
1,1,2-TRICHLOROETHANE		BPID		ND[7.6E-03]	HEATED CANISTER	FID
1,1,2-TRICHLOROETHANE		BPIE1		ND[1.7E-02]	HEATED CANISTER	FID
1,1,2-TRICHLOROETHANE		BPIE2		ND[1.8E-02]	HEATED CANISTER	FID
1,1,2-TRICHLOROETHANE		BPIF1		ND[3.9E-02]	HEATED CANISTER	FID
1,1,2-TRICHLOROETHANE		BPIF2		ND[2.4E-02]	HEATED CANISTER	FID
1,1,2-TRICHLOROETHANE		BPIG		ND[8.3E-03]	HEATED CANISTER	FID
1,1,2-TRICHLOROETHANE		BPIH1		ND[2.5E-02]	HEATED CANISTER	FID
1,1,2-TRICHLOROETHANE		BPIH2		ND[1.9E-02]	HEATED CANISTER	FID
1,1,2-TRICHLOROETHANE		BPII1		ND[1.0E-02]	HEATED CANISTER	FID
1,1,2-TRICHLOROETHANE		BPII2		ND[2.1E-02]	HEATED CANISTER	FID
1,1,2-TRICHLOROETHANE		BPIJ		ND[7.4E-03]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN**		
31	2		ND to 5.5E-04	1.2E-05		
TRICHLOROETHYLENE		BPG		ND[1.4E-04]	VOST	
TRICHLOROETHYLENE		BPC1a	4.7 to 360 ug/m3	1.8E-04	VOST	
TRICHLOROETHYLENE		BPC1b	<20.5-251 ug/m3	2.4E-04	CARB 422	
TRICHLOROETHYLENE		BPDa	3.6 to 5.8 ug/m3	4.5E-05	VOST	
TRICHLOROETHYLENE		BPDb	<205 - 874 ug/m3	1.0E-03	CARB 422	
TRICHLOROETHYLENE		BPG	3.2E-5 to 1.4E-4	4.5E-05	VOST	
TRICHLOROETHYLENE		BPL1		ND[0.0032]	M18	
TRICHLOROETHYLENE		BPL2		ND[0.0044]	M18	
TRICHLOROETHYLENE		BPL3		ND[0.0074]	M18	
TRICHLOROETHYLENE		BPMA1		5.9E-04	HEATED CANISTER	does not include DC & E tower vents
TRICHLOROETHYLENE		BPMA2		ND[4.3E-04]	HEATED CANISTER	does not include DC tower vent
TRICHLOROETHYLENE		BPMC1		3.9E-04	HEATED CANISTER	FID
TRICHLOROETHYLENE		BPMC2		3.1E-04	HEATED CANISTER	FID
TRICHLOROETHYLENE		BPME1		ND[1.2E-03]	HEATED CANISTER	FID
TRICHLOROETHYLENE		BPME2		ND[8.7E-04]	HEATED CANISTER	FID
TRICHLOROETHYLENE		BPME3		5.0E-04	HEATED CANISTER	FID
TRICHLOROETHYLENE		BPMF1		ND[4.8E-04]	HEATED CANISTER	FID
TRICHLOROETHYLENE		BPMF2		7.0E-04	HEATED CANISTER	FID
TRICHLOROETHYLENE		BPMJ		ND[1.1E-04]	HEATED CANISTER	FID
TRICHLOROETHYLENE		BPMK		1.2E-04	HEATED CANISTER	FID
TRICHLOROETHYLENE		BPML		7.8E-04	HEATED CANISTER	FID
TRICHLOROETHYLENE		BPMM1		ND[5.9E-05]	HEATED CANISTER	FID
TRICHLOROETHYLENE		BPMM2		2.8E-03	HEATED CANISTER	FID
TRICHLOROETHYLENE		BPMN		ND[2.5E-04]	HEATED CANISTER	FID
TRICHLOROETHYLENE		BPIA1		ND[1.9E-02]	HEATED CANISTER	FID
TRICHLOROETHYLENE		BPIA2		ND[4.5E-02]	HEATED CANISTER	FID
TRICHLOROETHYLENE		BPIB		ND[2.2E-02]	HEATED CANISTER	FID
TRICHLOROETHYLENE		BPIC1		ND[1.3E-02]	HEATED CANISTER	FID
TRICHLOROETHYLENE		BPID		ND[7.5E-03]	HEATED CANISTER	FID
TRICHLOROETHYLENE		BPIE1		ND[1.7E-02]	HEATED CANISTER	FID
TRICHLOROETHYLENE		BPIE2		ND[1.8E-02]	HEATED CANISTER	FID
TRICHLOROETHYLENE		BPIF1		ND[3.8E-02]	HEATED CANISTER	FID
TRICHLOROETHYLENE		BPIF2		ND[2.3E-02]	HEATED CANISTER	FID
TRICHLOROETHYLENE		BPIG		ND[8.3E-03]	HEATED CANISTER	FID
TRICHLOROETHYLENE		BPIH1		ND[2.4E-02]	HEATED CANISTER	FID

TABLE 3 SUMMARY OF 'AIR TOXIC' EMISSIONS FROM KRAFT MILL BLEACH PLANTS, CONTD.

VOLATILE ORGANIC COMPOUND		MILL CODE	EMISSIONS RANGE lb/ADTBP	EMISSIONS AVG lb/ADTBP	TEST METHOD	COMMENTS
TRICHLOROETHYLENE		BPIH2		ND[1.9E-02]	HEATED CANISTER	FID
TRICHLOROETHYLENE		BPIJ		ND[7.3E-03]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN*		
37	13		ND to 2.8E-03	3.7E-05		
VALERALDEHYDE		BPID	0.0005 to 0.0008	6.4E-04	IMPINGER	SYNONYM - PENTANAL; DNPH
VALERALDEHYDE		BPIE1		ND[2.9E-04]	IMPINGER	DNPH
VALERALDEHYDE		BPIE2		ND[2.9E-04]	IMPINGER	DNPH
VALERALDEHYDE		BPIF1	0.0009 to 0.0012	1.1E-03	IMPINGER	DNPH
VALERALDEHYDE		BPIF2	0.00032 to 0.00035	3.3E-04	IMPINGER	DNPH
VALERALDEHYDE		BPIG		ND[2.1E-04]	IMPINGER	DNPH
NO. OF TESTS	DETECTS		RANGE	MEDIAN*		
6	3		ND to 1.2E-03	2.8E-04		
m,p-XYLENE		BPG	1.9E-6 to 3.1E-4	1.0E-04	VOST	
m,p-XYLENE		BPI		ND [0.0054]	M18	
m,p-XYLENE		BPJ		ND [0.0056]	M18	
m,p-XYLENE		BPK1		ND [0.0044]	M18	
m,p-XYLENE		BPK2		ND [0.0074]	M18	
m,p-XYLENE		BPL1		ND[0.0032]	M18	
m,p-XYLENE		BPL2		ND[0.004]	M18	
m,p-XYLENE		BPL3		ND[0.008]	M18	
m,p-XYLENE		BPME1		4.8E-04	HEATED CANISTER	FID
m,p-XYLENE		BPME2		6.5E-04	HEATED CANISTER	FID
m,p-XYLENE		BPME3		3.1E-04	HEATED CANISTER	FID
m,p-XYLENE		BPMF1		7.7E-05	HEATED CANISTER	FID
m,p-XYLENE		BPMF2		4.9E-04	HEATED CANISTER	FID
m,p-XYLENE		BPMJ		2.7E-05	HEATED CANISTER	FID
m,p-XYLENE		BPMK		ND[4.4E-05]	HEATED CANISTER	FID
m,p-XYLENE		BPML		ND[6.1E-05]	HEATED CANISTER	FID
m,p-XYLENE		BPMM1		ND[1.6E-05]	HEATED CANISTER	FID
m,p-XYLENE		BPMM2		ND[3.9E-04]	HEATED CANISTER	FID
m,p-XYLENE		BPMN		ND[6.8E-05]	HEATED CANISTER	FID
m,p-XYLENE		BPIA1		ND[1.6E-02]	HEATED CANISTER	FID
m,p-XYLENE		BPIA2		ND[3.7E-02]	HEATED CANISTER	FID
m,p-XYLENE		BPIB		ND[1.8E-02]	HEATED CANISTER	FID
m,p-XYLENE		BPIC1		ND[1.0E-02]	HEATED CANISTER	FID
m,p-XYLENE		BPID		ND[6.0E-03]	HEATED CANISTER	FID
m,p-XYLENE		BPIE1		ND[1.4E-02]	HEATED CANISTER	FID
m,p-XYLENE		BPIE2		ND[1.5E-02]	HEATED CANISTER	FID
m,p-XYLENE		BPIF1		ND[3.1E-02]	HEATED CANISTER	FID
m,p-XYLENE		BPIF2		ND[1.9E-02]	HEATED CANISTER	FID
m,p-XYLENE		BPIG		ND[6.7E-03]	HEATED CANISTER	FID
m,p-XYLENE		BPIH1		ND[2.0E-02]	HEATED CANISTER	FID
m,p-XYLENE		BPIH2		ND[1.5E-02]	HEATED CANISTER	FID
m,p-XYLENE		BPII1		ND[8.3E-03]	HEATED CANISTER	FID
m,p-XYLENE		BPII2		ND[1.7E-02]	HEATED CANISTER	FID
m,p-XYLENE		BPIJ		ND[5.9E-03]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN*		
34	7		ND to 6.5E-04	7.5E-06		
o-XYLENE		BPG	6.5E-7 to 1.6E-4	5.3E-05	VOST	
o-XYLENE		BPI		ND [0.0054]	M18	
o-XYLENE		BPJ		ND [0.0056]	M18	
o-XYLENE		BPK1		ND [0.0044]	M18	
o-XYLENE		BPK2		ND [0.0074]	M18	
o-XYLENE		BPL1		ND[0.0032]	M18	
o-XYLENE		BPL2		ND[0.004]	M18	

TABLE 3 SUMMARY OF 'AIR TOXIC' EMISSIONS FROM KRAFT MILL BLEACH PLANTS, CONTD.

VOLATILE ORGANIC COMPOUND		MILL CODE	EMISSIONS RANGE lb/ADTBP	EMISSIONS AVG lb/ADTBP	TEST METHOD	COMMENTS
o-XYLENE		BPL3		ND[0.008]	M18	
o-XYLENE		BPME1		2.7E-04	HEATED CANISTER	FID
o-XYLENE		BPME2		1.2E-04	HEATED CANISTER	FID
o-XYLENE		BPME3		1.9E-04	HEATED CANISTER	FID
o-XYLENE		BPMF1		1.6E-04	HEATED CANISTER	FID
o-XYLENE		BPMF2		2.7E-04	HEATED CANISTER	FID
o-XYLENE		BPMJ		ND[3.1E-05]	HEATED CANISTER	FID
o-XYLENE		BPMK		2.3E-05	HEATED CANISTER	FID
o-XYLENE		BPML		ND[6.1E-05]	HEATED CANISTER	FID
o-XYLENE		BPMM1		ND[1.6E-05]	HEATED CANISTER	FID
o-XYLENE		BPMM2		ND[3.9E-04]	HEATED CANISTER	FID
o-XYLENE		BPMN		ND[6.8E-05]	HEATED CANISTER	FID
o-XYLENE		BPIA1		ND[1.6E-02]	HEATED CANISTER	FID
o-XYLENE		BPIA2		ND[3.7E-02]	HEATED CANISTER	FID
o-XYLENE		BPIB		ND[1.8E-02]	HEATED CANISTER	FID
o-XYLENE		BPIC1		ND[1.0E-02]	HEATED CANISTER	FID
o-XYLENE		BPID		ND[6.0E-03]	HEATED CANISTER	FID
o-XYLENE		BPIE1		ND[1.4E-02]	HEATED CANISTER	FID
o-XYLENE		BPIE2		ND[1.5E-02]	HEATED CANISTER	FID
o-XYLENE		BPIF1		ND[3.1E-02]	HEATED CANISTER	FID
o-XYLENE		BPIF2		ND[1.9E-02]	HEATED CANISTER	FID
o-XYLENE		BPIG		ND[6.7E-03]	HEATED CANISTER	FID
o-XYLENE		BPIH1		ND[2.0E-02]	HEATED CANISTER	FID
o-XYLENE		BPIH2		ND[1.5E-02]	HEATED CANISTER	FID
o-XYLENE		BPII1		ND[8.3E-03]	HEATED CANISTER	FID
o-XYLENE		BPII2		ND[1.7E-02]	HEATED CANISTER	FID
o-XYLENE		BPIJ		ND[5.9E-03]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN*		
34	7		ND to 2.7E-04	1.0E-05		
XYLENES		BPMA1		ND[2.1E-04]	HEATED CANISTER	does not include DC & E tower vents
XYLENES		BPMA2		ND[9.1E-05]	HEATED CANISTER	does not include DC tower vent
XYLENES		BPMC1		1.5E-04	HEATED CANISTER	FID
XYLENES		BPMC2		1.2E-03	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN**		
4	2		ND to 1.5E-04	8.7E-05		
			lb C/ADTBP	lb C/ADTBP		
TOTAL HYDROCARBONS		BPA	0.151 to 0.205	1.8E-01	METHOD 25A	NCASI Tech. Bull. No. 646
TOTAL HYDROCARBONS		BPB	0.256 to 0.280	2.6E-01	METHOD 25A	NCASI Tech. Bull. No. 646
TOTAL HYDROCARBONS		BPC1	0.022 to 0.029	2.7E-02	METHOD 25A	NCASI Tech. Bull. No. 646
TOTAL HYDROCARBONS		BPC2	0.001 to 0.039	3.3E-02	METHOD 25A	NCASI Tech. Bull. No. 646
TOTAL HYDROCARBONS		BPC3	0.072 to 0.120	9.6E-02	METHOD 25A	NCASI Tech. Bull. No. 646
TOTAL HYDROCARBONS		BPD1	0.129 to 0.337	2.2E-01	METHOD 25A	NCASI Tech. Bull. No. 646
TOTAL HYDROCARBONS		BPD2	0.162 to 0.399	2.8E-01	METHOD 25A	NCASI Tech. Bull. No. 646
TOTAL HYDROCARBONS		BPE	0.022 to 0.029	2.6E-02	METHOD 25A	NCASI Tech. Bull. No. 646
TOTAL HYDROCARBONS		BPF	0.049 to 0.075	6.2E-02	METHOD 25A	NCASI Tech. Bull. No. 646
TOTAL HYDROCARBONS		BPG1	0.040 to 0.049	4.4E-02	METHOD 25A	NCASI Tech. Bull. No. 646
TOTAL HYDROCARBONS		BPG2	0.033 to 0.036	3.4E-02	METHOD 25A	NCASI Tech. Bull. No. 646
TOTAL HYDROCARBONS		BPH1	0.023 to 0.031	2.7E-02	METHOD 25A	NCASI Tech. Bull. No. 646
TOTAL HYDROCARBONS		BPH2	0.007 to 0.008	8.0E-03	METHOD 25A	NCASI Tech. Bull. No. 646
TOTAL HYDROCARBONS		BPMA1		8.8E-02	METHOD 25A	does not include DC & E tower vents
TOTAL HYDROCARBONS		BPMA2		5.8E-02	METHOD 25A	does not include DC tower vent
TOTAL HYDROCARBONS		BPMC1		2.2E-02	METHOD 25A	
TOTAL HYDROCARBONS		BPMC2		4.8E-02	METHOD 25A	vents include scrubber inlet not outlet
TOTAL HYDROCARBONS		BPMF1		5.0E-02	METHOD 25A	
TOTAL HYDROCARBONS		BPMF2		3.1E-01	METHOD 25A	
TOTAL HYDROCARBONS		BPMJ		5.0E-02	METHOD 25A	
TOTAL HYDROCARBONS		BPMK		2.0E-01	METHOD 25A	
TOTAL HYDROCARBONS		BPML		3.6E-02	METHOD 25A	
TOTAL HYDROCARBONS		BPMM1		1.0E-02	METHOD 25A	

TABLE 3 SUMMARY OF 'AIR TOXIC' EMISSIONS FROM KRAFT MILL BLEACH PLANTS, CONTD.

VOLATILE ORGANIC COMPOUND	MILL CODE	EMISSIONS RANGE lb C/ADTBP	EMISSIONS AVG lb C/ADTBP	TEST METHOD	COMMENTS
TOTAL HYDROCARBONS	BPMM2		1.2E-01	METHOD 25A	
TOTAL HYDROCARBONS	BPMN		2.5E-02	METHOD 25A	
TOTAL HYDROCARBONS	BPIB	0.029 to 0.044	3.7E-02	METHOD 25A	
TOTAL HYDROCARBONS	BPIC1	0.137 to 0.142	1.3E-01	METHOD 25A	
TOTAL HYDROCARBONS	BPIC2		6.5E-02	METHOD 25A	
TOTAL HYDROCARBONS	BPIC3		1.1E-01	METHOD 25A	
TOTAL HYDROCARBONS	BPIC4		1.9E-01	METHOD 25A	
TOTAL HYDROCARBONS	BPII1	0.041 to 0.053	4.7E-02	METHOD 25A	
TOTAL HYDROCARBONS	BPII2		4.8E-01	METHOD 25A	
NO. OF TESTS	DETECTS		RANGE	MEDIAN	
32	32		0.001 to 0.480	5.4E-02	

NOTES
(a) U - unidentified and unconfirmed by GC/MS
(b) For bleach plants with codes BPMX (X = A to Q) the heated canister gases were concentrated before analysis on the FID;
(c) For bleach plants with codes BPIX (X = A to J) the heated canister gases were not concentrated before analysis on the FID;
(d) Data in Reference 22e were given in units of lb/ODTP; 1 ODTP is assumed equal to 1 ADTBP in this table;

MEDIAN - emperical median; MEDIAN* - "NORPLOT" median; MEDIAN** - "SDIn" median

VOLATILE ORGANIC COMPOUND	MILL CODE	EMISSIONS RANGE lb/ADTBP	EMISSIONS AVG lb/ADTBP	TEST METHOD	COMMENTS
CARBON MONOXIDE	BPIA1	1.59 to 1.73	1.7E+00	CEMS	
CARBON MONOXIDE	BPIA2	0.89 to 1.24	1.1E+00	CEMS	
CARBON MONOXIDE	BPIC1		1.3E+00	CEMS	
CARBON MONOXIDE	BPIC2		1.0E+00	CEMS	
CARBON MONOXIDE	BPIC3		1.4E+00	CEMS	
CARBON MONOXIDE	BPIC4		1.4E+00	CEMS	
CARBON MONOXIDE	BPID	0.089 to 0.671	4.3E-01	CEMS	
CARBON MONOXIDE	BPIE1		6.9E-01	CEMS	
CARBON MONOXIDE	BPIE2		7.0E-01	CEMS	
CARBON MONOXIDE	BPIF1		3.1E-03	CEMS	
CARBON MONOXIDE	BPIF2		3.1E-03	CEMS	
CARBON MONOXIDE	BPII1	0.30 to 0.47	3.8E-01	CEMS	
CARBON MONOXIDE	BPII2		9.6E-01	CEMS	
CARBON MONOXIDE	BPIJ	0.56 to 0.63	6.0E-01	CEMS	
NO. OF TESTS	DETECTS		RANGE	MEDIAN	
14	14		0.089 to 1.073	8.3E-01	

TABLE 3A ESTIMATING BLEACH PLANT CHLOROFORM FORMATION FOR ≤0.1 PERCENT HYPOCHLORITE SEQUENCES

PULP SPECIES, CHLORINATION STAGE CONDITIONS*	TOTAL CHLOROFORM RELEASED,** lb/ODT BROWNSTOCK	
Hardwood, ≤70% Substitution	1.83 x Chlorine Factor - 0.06	eq. 1
Softwood, Chlorine Factor ≥0.15, Zero Chlorine Dioxide Substitution, or Simultaneous Addition of Chlorine and Chlorine Dioxide, or <40 Percent of Total Available Chlorine Applied as Chlorine Dioxide is Added Before Chlorine. Total Substitution May or May Not be Higher than 40 Percent.	4.06 x Chlorine Factor - 0.50	eq. 2
Softwood, Chlorine Factor <0.15, Zero Chlorine Dioxide Substitution, or Simultaneous Addition of Chlorine and Chlorine Dioxide, or <40 Percent of Total Available Chlorine Applied as Chlorine Dioxide is Added Before Chlorine. Total Substitution Between Zero and 90 Percent.	0.74 x Chlorine Factor	eq. 3
Softwood, ≥40 Percent of Total Available Chlorine Applied as Chlorine Dioxide is Added Before Chlorine. Total Substitution ≥40 Percent and ≤70 Percent.	2.91 x Chlorine Factor - 0.09	eq. 4
100 Percent ClO_2 Substitution, All Conditions	0.01	

*Chlorine Factor = $\frac{\text{Chlorine, Percent}}{\text{Kappa No.}}$ Chlorine, Percent = $\frac{\text{lb Chlorine}}{\text{lb OD Brownstock}}$ x 100

**From NCASI studies of the total chloroform formed in the bleach plant, an average of 52% (range 6 to 90%) was found to be released through the bleach plant vents, with the remaining 48% (range 6 to 94%) discharged with the bleach plant effluent to the waste treatment facility.

TABLE 3B BLEACH PLANT CHLOROFORM FORMATION ESTIMATES FOR SEQUENCES WITH HYPOCHLORITE

BLEACHING SEQUENCE HYPOCHLORITE USE*	CHLOROFORM, lb/ODT BROWNSTOCK					
	Air Emissions from Vents		Discharge to Waste Treatment Facility		Total	
	Range	Average	Range	Average	Range	Average
0.1 to <0.5 percent	0.07 to 0.73	0.26	0.08 to 0.76	0.24	0.3 to 1.0	0.5
0.5 to 2 percent	0.12 to 1.10	0.52	0.14 to 1.14	0.48	0.5 to 1.5	1.0
>2 percent	0.24 to 2.19	0.78	0.27 to 2.28	0.72	1.0 to 3.0	1.5

*Percent hypochlorite use includes the hypochlorite generated by scrubbing Cl_2 from ClO_2 generator gases and used in the E stage. It is expressed as (lb available chlorine used/lb OD brownstock pulp) x 100. If sodium hypochlorite usage rates are known, then the following conversion applies:

$$\frac{\text{lb available } Cl_2 \text{ used}}{\text{lb OD brownstock pulp}} = \frac{35.5}{74.5} \cdot \frac{\text{lb NaOCl used}}{\text{lb OD brownstock pulp}}$$

TABLE 4 SUMMARY OF 'AIR TOXIC' EMISSIONS FROM OXYGEN DELIGNIFICATION SYSTEM VENTS

MILL CODE	TEST DATE	WOOD TYPE	ADTUBP/ DAY	WASHER TYPE	VENTS TESTED	REF.
ODA1	1991	HW	725	VACUUM	BLOW TANK, EO WASHER, PO FILTRATE TANKS	8
ODA2	1991/1992**	SW	650 & 800	VACUUM	BLOW TANK, EO WASHER, PO FILTRATE TANKS	7, 8
ODB	1991	SW	NA	VACUUM	BLOW TANK, PO WASHERS, PO FILTRATE TANKS	8
ODMA1	1994	HW	800	PRESSES	BLOW TANK, PO STOCK CHEST, PRESSATE TANKS	12
ODMA2	1994	SW	411	VACUUM	BLOW TANK, PO WASHERS, PO FILTRATE TANKS	12
ODMC1	1994	HW	748	VAC/PRES	BLOW & FEED TANK, WASHER, PRESS, FILTR. TANKS	12
ODMC2	1994	SW	723	VAC/PRES	BLOW & FEED TANK, WASHER, PRESS, FILTR. TANKS	12
ODMK	1994	HW	1389	VACUUM	BLOW TANK, WASHERS, STOCK CHEST, FILTR. TANKS	12
ODMN	1994	SW	1364	PRESSES	BLOW TANK, STOCK CHEST, FILTR. TANKS + PRESSES	12
ODII	1993	SW	2400	PRESSES	BLOW, SURGE, FILTR. and LEVEL TANKS, PRESS VENT	9

Notes
** this source was tested twice; emissions given are averages;

References

7. Testing of Non-combustion Sources in a Pulp & Paper Facility, EPA Contract No. 68D90055, August 1992.
8. Tests conducted by NCASI in 1991.
9. Individual Mill Test Results for 'Air Toxics' - NCASI Mill File Information.
12. Volatile Organic Emissions from Pulp and Paper Mill Sources - Part I - Oxygen Delignification Systems, NCASI Technical Bulletin No. 675, August 1994.

TABLE 4 SUMMARY OF 'AIR TOXIC' EMISSIONS FROM OXYGEN DELIGNIFICATION SYSTEM VENTS, CONTD.

VOLATILE ORGANIC COMPOUND	MILL CODE	EMISSIONS RANGE lb/ADTUBP	AVG lb/ADTUBP	TEST METHOD	COMMENTS
ACETALDEHYDE	ODMA1		1.6E-01	IMPINGER	NCASI METHOD
ACETALDEHYDE	ODMA2		1.4E-02	IMPINGER	NCASI METHOD
ACETALDEHYDE	ODMC1		3.0E-02	IMPINGER	NCASI METHOD
ACETALDEHYDE	ODMC2		1.2E-02	IMPINGER	NCASI METHOD
ACETALDEHYDE	ODMK		4.9E-03	HEATED CANISTER	FID WITH CONCENTRATOR
ACETALDEHYDE	ODMN		8.0E-03	HEATED CANISTER	FID WITH CONCENTRATOR
ACETALDEHYDE	ODII	0.0413 to 0.0673	5.5E-02	HEATED CANISTER	FID, 1.3E-03 by DNPH
NO. OF TESTS / DETECTS		RANGE	MEDIAN		
7 / 7		8.0E-03 to 1.6E-01	1.4E-02		
ACETONE	ODA1	0.027 to 0.036	3.2E-02	IMPINGER	NCASI METHOD
ACETONE	ODA2	0.002 to 0.023	1.2E-02	IMPINGER	NCASI METHOD
ACETONE	ODB	0.065 to 0.069	6.7E-02	IMPINGER	NCASI METHOD
ACETONE	ODMA1		2.2E-01	HEATED CANISTER	FID WITH CONCENTRATOR
ACETONE	ODMA2		2.4E-02	HEATED CANISTER	FID WITH CONCENTRATOR
ACETONE	ODMC1		3.5E-02	HEATED CANISTER	FID WITH CONCENTRATOR
ACETONE	ODMC2		2.1E-02	HEATED CANISTER	FID WITH CONCENTRATOR
ACETONE	ODMK		1.8E-02	HEATED CANISTER	FID WITH CONCENTRATOR
ACETONE	ODMN		1.7E-02	HEATED CANISTER	FID WITH CONCENTRATOR
ACETONE	ODII	0.064 to 0.118	9.1E-02	HEATED CANISTER	FID, 5.8E-04 by DNPH
NO. OF TESTS / DETECTS		RANGE	MEDIAN		
10 / 10		2.0E-03 to 2.2E-01	2.8E-02		
ACETOPHENONE	ODII		ND[3.2E-03]	HEATED CANISTER	FID, ND[1.4E-06] by DNPH
ACROLEIN	ODMC1		ND[2.2E-05]	IMPINGER	NCASI METHOD
ACROLEIN	ODMK		2.8E-05	HEATED CANISTER	FID WITH CONCENTRATOR
ACROLEIN	ODMN		1.2E-04	HEATED CANISTER	FID WITH CONCENTRATOR, U
ACROLEIN	ODII		ND[1.5E-03]	HEATED CANISTER	FID, ND[6.3E-07] by DNPH
NO. OF TESTS / DETECTS		RANGE	MEDIAN**		
4 / 2		ND to 1.2E-04	2.0E-05		
BENZALDEHYDE	ODII	4.8E-5 to 9.6E-5	6.6E-05	IMPINGER	DNPH
BENZENE	ODMA1		6.5E-05	HEATED CANISTER	FID WITH CONCENTRATOR
BENZENE	ODMA2		1.1E-04	HEATED CANISTER	FID WITH CONCENTRATOR
BENZENE	ODMC1		4.0E-05	HEATED CANISTER	FID WITH CONCENTRATOR
BENZENE	ODMC2		ND[6.0E-05]	HEATED CANISTER	FID WITH CONCENTRATOR
BENZENE	ODMK		ND[2.2E-05]	HEATED CANISTER	FID WITH CONCENTRATOR
BENZENE	ODMN		2.4E-05	HEATED CANISTER	FID WITH CONCENTRATOR
BENZENE	ODII		ND[2.1E-03]	HEATED CANISTER	FID
NO. OF TESTS / DETECTS		RANGE	MEDIAN		
7 / 4		ND to 1.1E0-4	2.4E-05		
CARBON TETRACHLORIDE	ODMA1		ND[3.2E-04]	HEATED CANISTER	FID WITH CONCENTRATOR
CARBON TETRACHLORIDE	ODMA2		ND[1.6E-03]	HEATED CANISTER	FID WITH CONCENTRATOR
CARBON TETRACHLORIDE	ODMC1		ND[1.1E-03]	HEATED CANISTER	FID WITH CONCENTRATOR
CARBON TETRACHLORIDE	ODMC2		9.1E-04	HEATED CANISTER	FID WITH CONCENTRATOR, U
CARBON TETRACHLORIDE	ODMK		ND[5.2E-04]	HEATED CANISTER	FID WITH CONCENTRATOR
CARBON TETRACHLORIDE	ODMN		ND[1.1E-03]	HEATED CANISTER	FID WITH CONCENTRATOR
CARBON TETRACHLORIDE	ODII	0.006 to 0.008	6.5E-03	HEATED CANISTER	FID
NO. OF TESTS / DETECTS		RANGE	MEDIAN**		
7 / 2		ND to 9.1E-04	3.9E-04		
CHLOROBENZENE	ODMA1		ND[2.0E-05]	HEATED CANISTER	FID WITH CONCENTRATOR
CHLOROBENZENE	ODMA2		ND[2.8E-04]	HEATED CANISTER	FID WITH CONCENTRATOR
CHLOROBENZENE	ODMC1		ND[6.4E-05]	HEATED CANISTER	FID WITH CONCENTRATOR, U
CHLOROBENZENE	ODMC2		5.1E-05	HEATED CANISTER	FID WITH CONCENTRATOR
CHLOROBENZENE	ODMK		ND[3.2E-05]	HEATED CANISTER	FID WITH CONCENTRATOR
CHLOROBENZENE	ODMN		3.6E-05	HEATED CANISTER	FID WITH CONCENTRATOR
CHLOROBENZENE	ODII		ND[3.0E-03]	HEATED CANISTER	FID
NO. OF TESTS / DETECTS		RANGE	MEDIAN**		
7 / 2		ND to 5.1E-05	1.6E-05		
CHLOROFORM	ODMA1		5.8E-04	HEATED CANISTER	FID WITH CONCENTRATOR

TABLE 4 SUMMARY OF 'AIR TOXIC' EMISSIONS FROM OXYGEN DELIGNIFICATION SYSTEM VENTS, CONTD.

VOLATILE ORGANIC COMPOUND		MILL CODE	EMISSIONS RANGE lb/ADTUBP	AVG lb/ADTUBP	TEST METHOD	COMMENTS
CHLOROFORM		ODMA2		ND[1.5E-03]	HEATED CANISTER	FID WITH CONCENTRATOR
CHLOROFORM		ODMC1		ND[8.2E-04]	HEATED CANISTER	FID WITH CONCENTRATOR
CHLOROFORM		ODMC2		ND[1.1E-03]	HEATED CANISTER	FID WITH CONCENTRATOR
CHLOROFORM		ODMK		9.0E-04	HEATED CANISTER	FID WITH CONCENTRATOR
CHLOROFORM		ODMN		ND[8.4E-04]	HEATED CANISTER	FID WITH CONCENTRATOR
CHLOROFORM		ODII		ND[8.4E-03]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN**		
7	2		ND to 9.0E-04	2.5E-04		
CRESOL-O		ODII	0.037 to 0.109	7.3E-02	HEATED CANISTER	FID
CUMENE		ODII	0.010 to 0.011	1.0E-02	HEATED CANISTER	FID
1,2-DICHLOROETHANE		ODMA1		ND[7.0E-05]	HEATED CANISTER	FID WITH CONCENTRATOR
1,2-DICHLOROETHANE		ODMA2		ND[4.5E-04]	HEATED CANISTER	FID WITH CONCENTRATOR
1,2-DICHLOROETHANE		ODMC1		ND[2.3E-04]	HEATED CANISTER	FID WITH CONCENTRATOR
1,2-DICHLOROETHANE		ODMC2		ND[3.1E-04]	HEATED CANISTER	FID WITH CONCENTRATOR
1,2-DICHLOROETHANE		ODMK		ND[1.1E-04]	HEATED CANISTER	FID WITH CONCENTRATOR
1,2-DICHLOROETHANE		ODMN		ND[2.4E-04]	HEATED CANISTER	FID WITH CONCENTRATOR
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
6	0		ND	ND		
DIMETHYL DISULFIDE		ODMK		ND[1.4E-03]	HEATED CANISTER	FID WITH CONCENTRATOR
DIMETHYL DISULFIDE		ODMN		ND[2.8E-03]	HEATED CANISTER	FID WITH CONCENTRATOR
DIMETHYL DISULFIDE		ODII	0.004 to 0.005	4.1E-03		
NO. OF TESTS	DETECTS		RANGE	MEDIAN**		
3	1		ND to 5.1E-03	1.8E-03		
DIMETHYL SULFIDE		ODMK		2.8E-03	HEATED CANISTER	FID WITH CONCENTRATOR
DIMETHYL SULFIDE		ODMN		9.1E-04	HEATED CANISTER	FID WITH CONCENTRATOR
DIMETHYL SULFIDE		ODII		ND[1.7E-03]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
3	2		ND to 2.6E-03	9.1E-04		
ETHANOL		ODII	0.0034 to 0.0040	3.6E-03	HEATED CANISTER	FID
ETHYLBENZENE		ODII		ND[2.9E-03]	HEATED CANISTER	FID
FORMALDEHYDE		ODMA1		1.5E-04	IMPINGER	NCASI METHOD
FORMALDEHYDE		ODMA2		3.2E-03	IMPINGER	NCASI METHOD
FORMALDEHYDE		ODMC1		3.0E-04	IMPINGER	NCASI METHOD
FORMALDEHYDE		ODMC2		4.0E-03	IMPINGER	NCASI METHOD
FORMALDEHYDE		ODMK		4.1E-03	IMPINGER	NCASI METHOD
FORMALDEHYDE		ODMN		ND[4.4E-04]	IMPINGER	NCASI METHOD
FORMALDEHYDE		ODII	3.4E-6 to 6.8E-6	5.8E-06	IMPINGER	NCASI METHOD
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
7	6		ND to 4.1E-03	3.0E-04		
n-HEXANE		ODMK		3.5E-05	HEATED CANISTER	FID WITHOUT CONCENTRATOR
n-HEXANE		ODMN		3.3E-05	HEATED CANISTER	FID WITHOUT CONCENTRATOR
n-HEXANE		ODII		ND[2.3E-03]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
3	2		ND to 3.5E-05	3.3E-05		
ISOPROPANOL		ODII	0.0016 to 0.0030	2.1E-03	HEATED CANISTER	FID
METHANOL		ODA1	0.79 to 0.92	8.6E-01	NCASI METHOD	
METHANOL		ODA2	0.97 to 1.85	1.4E+00	NCASI METHOD	
METHANOL		ODB	0.58 to 0.60	5.8E-01	NCASI METHOD	
METHANOL		ODMA1		1.5E+00	HEATED CANISTER	FID WITHOUT CONCENTRATOR
METHANOL		ODMA2		6.4E-01	HEATED CANISTER	FID WITHOUT CONCENTRATOR
METHANOL		ODMC1		1.9E+00	HEATED CANISTER	FID WITHOUT CONCENTRATOR
METHANOL		ODMC2		1.1E+00	HEATED CANISTER	FID WITHOUT CONCENTRATOR
METHANOL		ODMK		4.3E-01	HEATED CANISTER	FID WITHOUT CONCENTRATOR
METHANOL		ODMN		3.2E-01	HEATED CANISTER	FID WITHOUT CONCENTRATOR

TABLE 4 SUMMARY OF 'AIR TOXIC' EMISSIONS FROM OXYGEN DELIGNIFICATION SYSTEM VENTS, CONTD.

VOLATILE ORGANIC COMPOUND		MILL CODE	EMISSIONS RANGE lb/ADTUBP	AVG lb/ADTUBP	TEST METHOD	COMMENTS
METHANOL		ODII	1.03 to 1.28	1.1E+00	HEATED CANISTER	FID WITHOUT CONCENTRATOR
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
10	10		0.32 to 1.91	9.8E-01		
METHYL ETHYL KETONE		ODA1	0.0010 to 0.0020	1.3E-03	NCASI METHOD	
METHYL ETHYL KETONE		ODA2	2.6E-4 to 0.0016	9.9E-04	NCASI METHOD	
METHYL ETHYL KETONE		ODB	0.0061 to 0.0063	6.2E-03	NCASI METHOD	
METHYL ETHYL KETONE		ODMA1		1.1E-02	HEATED CANISTER	FID WITH CONCENTRATOR
METHYL ETHYL KETONE		ODMA2		4.8E-03	HEATED CANISTER	FID WITH CONCENTRATOR
METHYL ETHYL KETONE		ODMC1		2.0E-03	HEATED CANISTER	FID WITH CONCENTRATOR
METHYL ETHYL KETONE		ODMC2		1.6E-03	HEATED CANISTER	FID WITH CONCENTRATOR
METHYL ETHYL KETONE		ODMK		7.6E-04	HEATED CANISTER	FID WITH CONCENTRATOR
METHYL ETHYL KETONE		ODMN		1.5E-03	HEATED CANISTER	FID WITH CONCENTRATOR
METHYL ETHYL KETONE		ODII	0.0048 to 0.0079	6.2E-03	HEATED CANISTER	FID, 5.6E-05 by DNPH
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
10	10		2.6E-04 to 1.1E-02	1.8E-03		
METHYL ISOBUTYL KETONE		ODMA1		2.7E-05	HEATED CANISTER	FID WITH CONCENTRATOR
METHYL ISOBUTYL KETONE		ODMA2		ND[1.9E-04]	HEATED CANISTER	FID WITH CONCENTRATOR
METHYL ISOBUTYL KETONE		ODMC1		8.2E-05	HEATED CANISTER	FID WITH CONCENTRATOR
METHYL ISOBUTYL KETONE		ODMC2		1.0E-04	HEATED CANISTER	FID WITH CONCENTRATOR
METHYL ISOBUTYL KETONE		ODMK		1.7E-05	HEATED CANISTER	FID WITH CONCENTRATOR
METHYL ISOBUTYL KETONE		ODMN		5.3E-05	HEATED CANISTER	FID WITH CONCENTRATOR
METHYL ISOBUTYL KETONE		ODII		ND[2.7E-03]	HEATED CANISTER	FID, ND[1.1E-06] by DNPH
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
7	5		ND to 1.0E-4	2.7E-05		
METHYL MERCAPTAN		ODMK		ND[6.8E-04]	HEATED CANISTER	FID WITH CONCENTRATOR
METHYL MERCAPTAN		ODMN		ND[1.5E-03]	HEATED CANISTER	FID WITH CONCENTRATOR
METHYL MERCAPTAN		ODII		ND[1.3E-03]		
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
3	0		ND	ND		
METHYLENE CHLORIDE		ODMA1		2.9E-04	HEATED CANISTER	FID WITH CONCENTRATOR
METHYLENE CHLORIDE		ODMA2		1.0E-03	HEATED CANISTER	FID WITH CONCENTRATOR
METHYLENE CHLORIDE		ODMC1		ND[4.2E-04]	HEATED CANISTER	FID WITH CONCENTRATOR
METHYLENE CHLORIDE		ODMC2		5.4E-04	HEATED CANISTER	FID WITH CONCENTRATOR, U
METHYLENE CHLORIDE		ODMK		ND[2.0E-04]	HEATED CANISTER	FID WITH CONCENTRATOR
METHYLENE CHLORIDE		ODMN		4.4E-04	HEATED CANISTER	FID WITH CONCENTRATOR
METHYLENE CHLORIDE		ODII		ND[2.3E-03]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
7	4		ND to 1.0E-03	2.9E-04		
PHENOL		ODII		ND[2.5E-03]	HEATED CANISTER	FID
ALPHA-PINENE		ODA2		ND[3.5E-03]	SEMI-VOST	
ALPHA-PINENE		ODMA1		4.5E-03	HEATED CANISTER	FID WITHOUT CONCENTRATOR
ALPHA-PINENE		ODMA2		1.2E-02	HEATED CANISTER	FID WITHOUT CONCENTRATOR
ALPHA-PINENE		ODMC1		2.6E-02	HEATED CANISTER	FID WITHOUT CONCENTRATOR
ALPHA-PINENE		ODMC2		7.1E-02	HEATED CANISTER	FID WITHOUT CONCENTRATOR
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
5	4		ND to 7.1E-02	1.2E-02		
BETA-PINENE		ODA2		ND[1.9E-03]	SEMI-VOST	
BETA-PINENE		ODMA1		2.8E-03	HEATED CANISTER	FID WITHOUT CONCENTRATOR
BETA-PINENE		ODMA2		1.6E-03	HEATED CANISTER	FID WITHOUT CONCENTRATOR
BETA-PINENE		ODMC1		7.2E-02	HEATED CANISTER	FID WITHOUT CONCENTRATOR
BETA-PINENE		ODMC2		8.2E-02	HEATED CANISTER	FID WITHOUT CONCENTRATOR
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
5	4		ND to 8.2E-02	2.8E-03		
STYRENE		ODMA1		5.2E-04	HEATED CANISTER	FID WITH CONCENTRATOR
STYRENE		ODMA2		1.1E-04	HEATED CANISTER	FID WITH CONCENTRATOR
STYRENE		ODMC1		3.1E-04	HEATED CANISTER	FID WITH CONCENTRATOR

TABLE 4 SUMMARY OF 'AIR TOXIC' EMISSIONS FROM OXYGEN DELIGNIFICATION SYSTEM VENTS, CONTD.

VOLATILE ORGANIC COMPOUND		MILL CODE	EMISSIONS RANGE lb/ADTUBP	AVG lb/ADTUBP	TEST METHOD	COMMENTS
STYRENE		ODMC2		5.7E-04	HEATED CANISTER	FID WITH CONCENTRATOR
STYRENE		ODMK		ND[3.0E-05]	HEATED CANISTER	FID WITH CONCENTRATOR
STYRENE		ODMN		6.8E-05	HEATED CANISTER	FID WITH CONCENTRATOR
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
6	5		ND to 5.7E-04	2.1E-04		
TETRACHLOROETHYLENE		ODMA1		8.2E-05	HEATED CANISTER	FID WITH CONCENTRATOR
TETRACHLOROETHYLENE		ODMA2		1.0E-03	HEATED CANISTER	FID WITH CONCENTRATOR
TETRACHLOROETHYLENE		ODMC1		1.9E-04	HEATED CANISTER	FID WITH CONCENTRATOR, U
TETRACHLOROETHYLENE		ODMC2		2.7E-04	HEATED CANISTER	FID WITH CONCENTRATOR, U
TETRACHLOROETHYLENE		ODMK		8.8E-05	HEATED CANISTER	FID WITH CONCENTRATOR, U
TETRACHLOROETHYLENE		ODMN		2.0E-04	HEATED CANISTER	FID WITH CONCENTRATOR
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
6	6		8.2E-05 to 1.0E-03	2.0E-04		
TOLUENE		ODMA1		1.1E-04	HEATED CANISTER	FID WITH CONCENTRATOR
TOLUENE		ODMA2		1.1E-04	HEATED CANISTER	FID WITH CONCENTRATOR
TOLUENE		ODMC1		6.1E-05	HEATED CANISTER	FID WITH CONCENTRATOR
TOLUENE		ODMC2		4.0E-04	HEATED CANISTER	FID WITH CONCENTRATOR
TOLUENE		ODMK		ND[2.0E-05]	HEATED CANISTER	FID WITH CONCENTRATOR
TOLUENE		ODMN		4.5E-05	HEATED CANISTER	FID WITH CONCENTRATOR
TOLUENE		ODII		ND[2.5E-03]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
7	5		ND to 4.0E-04	6.1E-05		
1,2,4-TRICHLOROBENZENE		ODMA1		4.4E-04	HEATED CANISTER	FID WITH CONCENTRATOR
1,2,4-TRICHLOROBENZENE		ODMA2		1.8E-04	HEATED CANISTER	FID WITH CONCENTRATOR
1,2,4-TRICHLOROBENZENE		ODMC1		ND[1.0E-04]	HEATED CANISTER	FID WITH CONCENTRATOR
1,2,4-TRICHLOROBENZENE		ODMK		ND[5.0E-05]	HEATED CANISTER	FID WITH CONCENTRATOR
1,2,4-TRICHLOROBENZENE		ODMN		3.5E-04	HEATED CANISTER	FID WITH CONCENTRATOR
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
5	3		ND to 4.4E-04	1.8E-04		
1,1,1-TRICHLOROETHANE		ODMC1		ND[2.2E-04]	HEATED CANISTER	FID WITH CONCENTRATOR
1,1,1-TRICHLOROETHANE		ODMC2		2.8E-04	HEATED CANISTER	FID WITH CONCENTRATOR, U
1,1,1-TRICHLOROETHANE		ODMK		ND[1.1E-04]	HEATED CANISTER	FID WITH CONCENTRATOR
1,1,1-TRICHLOROETHANE		ODMN		1.8E-04	HEATED CANISTER	FID WITH CONCENTRATOR
1,1,1-TRICHLOROETHANE		ODII		ND[3.6E-03]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN[a]		
5	2		ND to 2.8E-04	9.2E-05		
1,1,2-TRICHLOROETHANE		ODMA1		1.3E-03	HEATED CANISTER	FID WITH CONCENTRATOR
1,1,2-TRICHLOROETHANE		ODMA2		3.0E-04	HEATED CANISTER	FID WITH CONCENTRATOR
1,1,2-TRICHLOROETHANE		ODMC1		3.9E-04	HEATED CANISTER	FID WITH CONCENTRATOR, U
1,1,2-TRICHLOROETHANE		ODMC2		2.4E-04	HEATED CANISTER	FID WITH CONCENTRATOR, U
1,1,2-TRICHLOROETHANE		ODMK		6.7E-05	HEATED CANISTER	FID WITH CONCENTRATOR, U
1,1,2-TRICHLOROETHANE		ODMN		1.3E-04	HEATED CANISTER	FID WITH CONCENTRATOR
1,1,2-TRICHLOROETHANE		ODII		ND[3.6E-03]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
7	6		ND to 1.3E-03	2.4E-04		
TRICHLOROETHYLENE		ODMA1		4.6E-04	HEATED CANISTER	FID WITH CONCENTRATOR
TRICHLOROETHYLENE		ODMA2		4.2E-04	HEATED CANISTER	FID WITH CONCENTRATOR
TRICHLOROETHYLENE		ODMC1		ND[2.2E-04]	HEATED CANISTER	FID WITH CONCENTRATOR
TRICHLOROETHYLENE		ODMC2		ND[3.1E-04]	HEATED CANISTER	FID WITH CONCENTRATOR
TRICHLOROETHYLENE		ODMK		ND[1.1E-04]	HEATED CANISTER	FID WITH CONCENTRATOR
TRICHLOROETHYLENE		ODMN		ND[2.4E-04]	HEATED CANISTER	FID WITH CONCENTRATOR
TRICHLOROETHYLENE		ODII	ND to 0.0078	4.3E-03	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN[a]		
7	3		ND to 7.8E-03	2.8E-04		
m,p-XYLENE		ODMK		ND[3.0E-05]	HEATED CANISTER	FID WITH CONCENTRATOR
m,p-XYLENE		ODMN		4.6E-05	HEATED CANISTER	FID WITH CONCENTRATOR

TABLE 4 SUMMARY OF 'AIR TOXIC' EMISSIONS FROM OXYGEN DELIGNIFICATION SYSTEM VENTS, CONTD.

VOLATILE ORGANIC COMPOUND		MILL CODE	EMISSIONS RANGE lb/ADTUBP	AVG lb/ADTUBP	TEST METHOD	COMMENTS
m,p-XYLENE		ODII		ND[2.9E-03]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN**		
3	1		ND to 4.6E-05	1.8E-05		
o-XYLENE		ODMK		ND[3.0E-05]	HEATED CANISTER	FID WITH CONCENTRATOR
o-XYLENE		ODMN		9.1E-05	HEATED CANISTER	FID WITH CONCENTRATOR
o-XYLENE		ODII		ND[2.9E-03]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN**		
3	1		ND to 9.1E-05	3.5E-05		
XYLENES		ODMA1		2.1E-05	HEATED CANISTER	FID WITH CONCENTRATOR
XYLENES		ODMA2		1.4E-04	HEATED CANISTER	FID WITH CONCENTRATOR
XYLENES		ODMC1		1.1E-04	HEATED CANISTER	FID WITH CONCENTRATOR
XYLENES		ODMC2		1.2E-04	HEATED CANISTER	FID WITH CONCENTRATOR
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
4	4		2.1E-05 to 1.4E-04	1.1E-04		
TERPENES		ODMK		7.7E-03	HEATED CANISTER	FID WITH CONCENTRATOR
TERPENES		ODMN		3.5E-02	HEATED CANISTER	FID WITH CONCENTRATOR
TERPENES		ODII	0.030 to 0.044	3.7E-02	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
3	3		7.7E-03 to 3.5E-02	3.5E-02		
			lb C/ADTUBP	lb C/ADTUBP		
TOTAL HYDROCARBONS		ODLA	0.031 to 0.036	3.3E-02	M25A	See NCASI Tech Bull No. 646 for details
TOTAL HYDROCARBONS		ODLB	0.110 to 0.150	1.3E-01	M25A	See NCASI Tech Bull No. 646 for details
TOTAL HYDROCARBONS		ODMA1		8.0E-01	M25A	
TOTAL HYDROCARBONS		ODMA2		2.2E-01	M25A	
TOTAL HYDROCARBONS		ODMC1	>0.85	8.5E-01	M25A	
TOTAL HYDROCARBONS		ODMC2		5.5E-01	M25A	
TOTAL HYDROCARBONS		ODMK		1.1E+00	M25A	
TOTAL HYDROCARBONS		ODMN		1.2E-01	M25A	
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
8	8		3.3E-02 to 1.1E+00	3.9E-01		

Notes

U - unidentified and unconfirmed by GC/MS

Note that for O2 delignification systems with codes ODMA1, ODMA2, ODMC1, ODMC2, ODMK & ODMN emissions were available in lb/ODT of brownstock to system; these were converted to lb/ADTP using a conversion factor of 1.1 ADTP = 1.0 ODTBS;

MEDIAN - empirical median; MEDIAN* - "NORPLOT" median; MEDIAN** - "SDln" median

CARBON MONOXIDE		ODII	0.0014 to 0.0016	1.5E-03	METHOD 10	

TABLE 5 SUMMARY OF 'AIR TOXIC' EMISSIONS FROM BROWNSTOCK WASHERS

MILL CODE	TEST DATE	WOOD TYPE	WASHER TYPE	ADTP/ DAY	VENTS TESTED	NO. OF VENTS	REF.
BSWA1	1991	SW	VDWs	272	HOOD VENT ONLY	1	8
BSWA2	1991	SW	VDWs	566	HOOD VENTS ONLY	3	8
BSWB	1991	SW	VDWs	818	HOOD, FOAM TANK, SCREEN TANK	3	8
BSWD	1990	HW/SW	VDWs	825	HOOD VENTS ONLY	-	9
BSWE	1990	HW/SW	VDW + DIFFUSION	2150	HOOD VENTS ONLY	-	9
BSWF	1990	HW/SW	VDWs	1934	HOOD VENTS ONLY	-	9
BSWG1	1992	SW	VDWs	625	HOOD VENT ONLY	1	3
BSWG2	1992	HW	VDWs	790	HOOD VENT ONLY	1	3
BSWH	1992	SW	VDWs	252	HOOD VENT ONLY	1	3
BSWI1	1992	HW	VDWs	740	HOOD VENT ONLY	1	9
BSWI2	1992	SW	VDWs	660	HOOD VENT ONLY	1	9
BSWJ	1992	SW	VDWs	800	HOOD & FILTRATE TANK	2	3
BSWMA1	1994	HW	VDW +TWIN ROLL PRESS	858	ALL EXCEPT PRESS FILTRATE TANK	3	15
BSWMA2	1994	SW	VDW +TWIN ROLL PRESS	376	ALL BSW VENTS	7	15
BSWMF	1994	HW	HORIZONTAL BELT	825	ALL BSW VENTS	1	15
BSWMG1	1994	HW	DIFFUSION	273	ALL BSW VENTS	1	15
BSWMG2	1994	SW	DIFFUSION	626	ALL BSW VENTS	2	15
BSWMH1	1994	SW	DIFF + 2 VDWs IN SERIES	891	ALL BSW VENTS	4	15
BSWMH2	1994	SW	4 VDWs IN SERIES	270	ALL BSW VENTS	7	15
BSWML1	1994	HW	3 VDWs IN SERIES	823	ALL BSW VENTS	3	15
BSWML2	1994	HW	DIFFUSION + 1 VDW	805	ALL BSW VENTS	3	15
BSWMM	1994	SW	2 COMPACTION BAFFLES	285	ALL BSW VENTS	1	15
BSWMO1	1994	SW	2 PRESSURE IN SERIES	235	ALL BSW VENTS	3	15
BSWMO2	1994	HW	2 PRESSURE IN SERIES	220	ALL BSW VENTS	3	15
BSWIA1	1993	SW	VDWs	783	BSW VENT	1	9
BSWIA2	1993	HW	DIFFUSION	811	DIFFUSION WASHER VENT	1	9
BSWID1	1993	SW	VDWs	285	HOOD VENTS AND FOAM TANK	3	9
BSWID2	1993	HW	VDWs	400	HOOD VENTS AND FOAM TANK	3	9

TABLE 5 SUMMARY OF 'AIR TOXIC' EMISSIONS FROM BROWNSTOCK WASHERS, CONTD.

MILL CODE	TEST DATE	WOOD TYPE	WASHER TYPE	ADTP/ DAY	VENTS TESTED	NO. OF VENTS	REF.
BSWIE1	1993	SW	VDWs	322	HOOD VENTS, FOAM TANK & CHEST	6a	9
BSWIE2	1993	HW	VDWs	508	HOOD VENTS, FOAM TANK & CHEST	6a	9
BSWIF	1993	SW	VDWs	700	HOOD VENTS, VAC PUMP VENTS	5	9
BSWIG1	1993	SW	VDWs	850	HOOD VENTS	3	9
BSWIG2	1993	HW	VDWs	750	HOOD VENTS	3	9
BSWIH1	1993	HW	VDWs	600	HOODS VENTS ONLY	4a	9
BSWIH2	1993	SW	VDWs	650	HOOD VENTS & FOAM TANK VENTS	5a	9
BSWIJ1	1993	HW	VDWs	800	HOOD VENTS & FOAM TANK VENT	4b	9
BSWIJ2	1993	SW	VDWs	450	HOOD, FOAM TANK and SEWER VENTS	5b	9

Notes

VDW - Vacuum Drum Washers;

a - emissions from two vents estimated from two other similar vents tested on this source;

b - emissions from one vent estimated from one other similar vent tested on this source;

References

3. Texas Emissions Speciation Study, Emission Test Results, Roy F. Weston, Inc., January 1993.
8. Tests conducted by NCASI in 1991.
9. Individual Mill Testing for 'Air Toxics' - NCASI Mill File Information.
15. Volatile Organic Emissions from Pulp and Paper Mill Sources - Part IV - Kraft Brownstock Washing, Screening and Rejects Refining Sources, NCASI Technical Bulletin No. 678, October 1994.

TABLE 5 SUMMARY OF 'AIR TOXIC' EMISSIONS FROM BROWNSTOCK WASHERS, CONTD.

VOLATILE ORGANIC COMPOUND	MILL CODE	EMISSIONS RANGE lb/ADTUBP	EMISSIONS AVG lb/ADTUBP	TEST METHOD	COMMENTS
VACUUM DRUM WASHERS					
ACETALDEHYDE	BSWMA1		3.8E-02	NMIT	NCASI IMPINGER METHOD
ACETALDEHYDE	BSWMA2		2.8E-02	NMIT	NCASI IMPINGER METHOD
ACETALDEHYDE	BSWMH1		1.7E-02	HEATED CANISTER	FID
ACETALDEHYDE	BSWMH2		2.0E-02	HEATED CANISTER	FID
ACETALDEHYDE	BSWML1		1.3E-02	CANISTER/IMPINGER	FID/NMIT
ACETALDEHYDE	BSWML2		7.5E-03	HEATED CANISTER	FID
ACETALDEHYDE	BSWIA1	0.020 to 0.055	3.3E-02	HEATED CANISTER	FID
ACETALDEHYDE	BSWID1	0.0038 to 0.0046	4.2E-03	RTI DRAFT	DNPH
ACETALDEHYDE	BSWID2	0.0053 to 0.0230	1.2E-02	RTI DRAFT	DNPH
ACETALDEHYDE	BSWIE1	0.0012 to 0.0035	2.3E-03	RTI DRAFT	DNPH
ACETALDEHYDE	BSWIE2	0.0013 to 0.0032	2.0E-03	RTI DRAFT	DNPH
ACETALDEHYDE	BSWIF	0.0017 to 0.0049	3.1E-03	RTI DRAFT	DNPH
ACETALDEHYDE	BSWIG1	0.0030 to 0.0041	3.6E-03	RTI DRAFT	DNPH
ACETALDEHYDE	BSWIG2	0.0044 to 0.0137	7.6E-03	RTI DRAFT	DNPH
ACETALDEHYDE	BSWIH1	0.042 to 0.100	7.2E-02	HEATED CANISTER	FID, 1.4E-02 by DNPH
ACETALDEHYDE	BSWIH2	0.031 to 0.052	3.5E-02	HEATED CANISTER	FID, 4.8E-03 by DNPH
ACETALDEHYDE	BSWIJ1	0.028 to 0.040	3.5E-02	HEATED CANISTER	FID, 3.0E-02 by DNPH
ACETALDEHYDE	BSWIJ2	0.022 to 0.039	3.1E-02	HEATED CANISTER	FID
NO. OF TESTS / DETECTS		RANGE	MEDIAN		
18 / 18		1.2E-03 to 1.0E-01	1.5E-02		
DIFFUSION, PRESSURE, BELT & COMPACTION BAFFLE WASHERS					
ACETALDEHYDE	BSWMG1		5.2E-03	HEATED CANISTER	FID
ACETALDEHYDE	BSWMG2		1.6E-03	HEATED CANISTER	FID
ACETALDEHYDE	BSWMM		6.9E-02	HEATED CANISTER	FID
ACETALDEHYDE	BSWMO1		2.2E-03	HEATED CANISTER	FID
ACETALDEHYDE	BSWMO2		2.0E-03	HEATED CANISTER	FID
ACETALDEHYDE	BSWMF		ND 2.0E-06	HEATED CANISTER	FID
ACETALDEHYDE	BSWIA2		ND 1.8E-03	HEATED CANISTER	FID
NO. OF TESTS / DETECTS		RANGE	MEDIAN		
7 / 5		ND to 6.9E-02	2.0E-03		
VACUUM DRUM WASHERS					
ACETONE	BSWA1	-	6.9E-02	NMIT	NCASI IMPINGER METHOD
ACETONE	BSWA2	0.034 to 0.043	3.9E-02	NMIT	NCASI IMPINGER METHOD
ACETONE	BSWB	0.019 to 0.020	2.0E-02	NMIT	NCASI IMPINGER METHOD
ACETONE	BSWF	0.019 to 0.163	6.1E-02	MOD NIOSH 2000	
ACETONE	BSWG1	-	7.7E-03	M18	
ACETONE	BSWG2	-	1.2E-02	M18	
ACETONE	BSWH	ND to 0.0478	2.9E-02	M18	
ACETONE	BSWJ	0.009 to 0.012	1.2E-02	M18	
ACETONE	BSWMA1		7.5E-02	HEATED CANISTER	FID
ACETONE	BSWMA2		1.5E-01	HEATED CANISTER	FID
ACETONE	BSWMH1		6.3E-02	HEATED CANISTER	FID
ACETONE	BSWMH2		2.9E-02	HEATED CANISTER	FID
ACETONE	BSWML1		2.3E-02	HEATED CANISTER	FID
ACETONE	BSWML2		7.5E-03	HEATED CANISTER	FID
ACETONE	BSWIA1	0.063 to 0.171	1.1E-01	HEATED CANISTER	FID
ACETONE	BSWID1	0.112 to 0.244	1.9E-01	HEATED CANISTER	FID, 6.7E-02 by DNPH
ACETONE	BSWID2	0.113 to 0.272	2.0E-01	HEATED CANISTER	FID, 7.0E-02 by DNPH
ACETONE	BSWIE1	0.102 to 0.138	1.2E-01	HEATED CANISTER	FID, 2.4E-02 by DNPH
ACETONE	BSWIE2	0.029 to 0.047	4.1E-02	HEATED CANISTER	FID, 1.7E-02 by DNPH
ACETONE	BSWIF	0.011 to 0.022	1.6E-02	RTI DRAFT	DNPH
ACETONE	BSWIG1	0.0030 to 0.0041	5.9E-03	RTI DRAFT	DNPH
ACETONE	BSWIG2	0.0044 to 0.0137	7.6E-03	RTI DRAFT	DNPH
ACETONE	BSWIH1	0.041 to 0.053	4.8E-02	HEATED CANISTER	FID, 5.0E-02 by DNPH
ACETONE	BSWIH2	0.071 to 0.163	9.4E-02	HEATED CANISTER	FID, 2.1E-02 by DNPH
ACETONE	BSWIJ1	0.028 to 0.040	4.2E-02	HEATED CANISTER	FID, 1.8E-02 by DNPH
ACETONE	BSWIJ2	0.057 to 0.106	8.1E-02	HEATED CANISTER	FID
NO. OF TESTS / DETECTS		RANGE	MEDIAN		
26 / 26		ND to 2.7E-01	4.2E-02		
DIFFUSION, PRESSURE, BELT & COMPACTION BAFFLE WASHERS					
ACETONE	BSWMG1		1.1E-02	HEATED CANISTER	FID
ACETONE	BSWMG2		3.5E-03	HEATED CANISTER	FID
ACETONE	BSWMM		1.0E-01	HEATED CANISTER	FID

TABLE 5 SUMMARY OF 'AIR TOXIC' EMISSIONS FROM BROWNSTOCK WASHERS, CONTD.

VOLATILE ORGANIC COMPOUND		MILL CODE	EMISSIONS RANGE lb/ADTUBP	AVG lb/ADTUBP	TEST METHOD	COMMENTS
ACETONE		BSWMO1		6.7E-03	HEATED CANISTER	FID
ACETONE		BSWMO2		4.9E-03	HEATED CANISTER	FID
ACETONE		BSWMF		1.2E-05	HEATED CANISTER	FID
ACETONE		BSWIA2	ND to 0.0045	2.9E-03	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
7	7		ND to 1.0E-01	4.9E-03		
VACUUM DRUM WASHERS						
ACETOPHENONE		BSWIA1		ND[3.6E-02]	HEATED CANISTER	FID
ACETOPHENONE		BSWID1	0.046 to 0.091	4.6E-02	HEATED CANISTER	FID, ND[2.6E-03] by DNPH
ACETOPHENONE		BSWID2		ND[1.3E-01]	HEATED CANISTER	FID, ND[2.3E-03] by DNPH
ACETOPHENONE		BSWIE1		ND[3.3E-02]	HEATED CANISTER	FID, ND[2.2E-03] by DNPH
ACETOPHENONE		BSWIE2		ND[1.8E-02]	HEATED CANISTER	FID, ND[1.2E-03] by DNPH
ACETOPHENONE		BSWIF		ND[2.2E-02]	HEATED CANISTER	FID, 5.0E-04 by DNPH
ACETOPHENONE		BSWIG1		ND[4.3E-02]	HEATED CANISTER	FID, ND[6.8E-04] by DNPH
ACETOPHENONE		BSWIG2		ND[5.1E-02]	HEATED CANISTER	FID, ND[6.7E-04] by DNPH
ACETOPHENONE		BSWIH1		ND[6.0E-02]	HEATED CANISTER	FID, ND[3.4E-04] by DNPH
ACETOPHENONE		BSWIH2		ND[7.1E-02]	HEATED CANISTER	FID, ND[2.3E-04] by DNPH
ACETOPHENONE		BSWIJ1		ND[3.0E-02]	HEATED CANISTER	FID, ND[1.6E-04] by DNPH
ACETOPHENONE		BSWIJ2		ND[2.6E-02]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN**		
12	1		ND to 0.091	8.0E-04		
VACUUM DRUM WASHERS						
ACROLEIN		BSWG2	2 ppb	1.1E-05	VOST	
ACROLEIN		BSWMH1		7.6E-04	HEATED CANISTER	FID
ACROLEIN		BSWMH2		2.7E-04	HEATED CANISTER	FID
ACROLEIN		BSWML1		2.5E-04	HEATED CANISTER	FID
ACROLEIN		BSWML2		1.4E-04	HEATED CANISTER	FID
ACROLEIN		BSWIA1		ND[1.7E-02]	HEATED CANISTER	FID
ACROLEIN		BSWID1		ND[4.2E-02]	HEATED CANISTER	FID, ND[1.2E-03] by DNPH
ACROLEIN		BSWID2		ND[6.2E-02]	HEATED CANISTER	FID, ND[1.1E-03] by DNPH
ACROLEIN		BSWIE1		ND[1.0E-03]	RTI DRAFT	DNPH
ACROLEIN		BSWIE2		ND[5.4E-04]	RTI DRAFT	DNPH
ACROLEIN		BSWIG1		ND[4.0E-04]	RTI DRAFT	DNPH
ACROLEIN		BSWIG2	ND to 9.4E-04	4.5E-04	RTI DRAFT	DNPH
ACROLEIN		BSWIH1		ND[2.8E-02]	HEATED CANISTER	FID, ND[4.7E-04] by DNPH
ACROLEIN		BSWIH2		ND[3.3E-02]	HEATED CANISTER	FID, ND[3.3E-04] by DNPH
ACROLEIN		BSWIJ1		ND[1.4E-02]	HEATED CANISTER	FID, ND[2.2E-04] by DNPH
ACROLEIN		BSWIJ2		ND[1.2E-02]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN*		
16	6		ND to 9.4E-04	1.8E-05		
DIFFUSION, PRESSURE, BELT & COMPACTION BAFFLE WASHERS						
ACROLEIN		BSWMG1		4.5E-05	HEATED CANISTER	FID
ACROLEIN		BSWMG2		4.7E-05	HEATED CANISTER	FID
ACROLEIN		BSWMM		1.7E-03	HEATED CANISTER	FID
ACROLEIN		BSWMO1		ND[2.8E-05]	HEATED CANISTER	FID
ACROLEIN		BSWMO2		4.8E-05	HEATED CANISTER	FID
ACROLEIN		BSWMF		ND[2.0E-06]	HEATED CANISTER	FID
ACROLEIN		BSWIA2		ND[2.3E-03]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
7	4		ND to 1.7E-03	4.5E-05		
VACUUM DRUM WASHERS						
BENZALDEHYDE		BSWID1		ND[2.3E-03]	RTI DRAFT	DNPH
BENZALDEHYDE		BSWID2		ND[2.1E-03]	RTI DRAFT	DNPH
BENZALDEHYDE		BSWIE1		ND[1.9E-03]	RTI DRAFT	DNPH
BENZALDEHYDE		BSWIE2		ND[1.0E-03]	RTI DRAFT	DNPH
BENZALDEHYDE		BSWIF	0.0006 to 0.0020	1.1E-03	RTI DRAFT	DNPH
BENZALDEHYDE		BSWIG1		ND[6.0E-04]	RTI DRAFT	DNPH
BENZALDEHYDE		BSWIG2		ND[6.0E-04]	RTI DRAFT	DNPH
BENZALDEHYDE		BSWIH1		ND[6.0E-04]	RTI DRAFT	DNPH
BENZALDEHYDE		BSWIH2		ND[4.1E-04]	RTI DRAFT	DNPH

TABLE 5 SUMMARY OF 'AIR TOXIC' EMISSIONS FROM BROWNSTOCK WASHERS, CONTD.

VOLATILE ORGANIC COMPOUND		MILL CODE	EMISSIONS RANGE lb/ADTUBP	EMISSIONS AVG lb/ADTUBP	TEST METHOD	COMMENTS
BENZALDEHYDE		BSWIJ1		ND to 0.0018	RTI DRAFT	DNPH
NO. OF TESTS	DETECTS		RANGE	MEDIAN*		
10	1		ND to 2.0E-03	2.4E-05		
VACUUM DRUM WASHERS						
BENZENE		BSWG1		ND[0.004]	M18	
BENZENE		BSWG2		ND[0.003]	M18	
BENZENE		BSWH		ND[0.019]	M18	
BENZENE		BSWI1		ND[0.0032]	M18	
BENZENE		BSWI2		ND[0.0036]	M18	
BENZENE		BSWJ		ND[0.006]	M18	
BENZENE		BSWMA1		1.8E-05	HEATED CANISTER	FID
BENZENE		BSWMA2		2.3E-05	HEATED CANISTER	FID
BENZENE		BSWMH1		8.2E-05	HEATED CANISTER	FID
BENZENE		BSWMH2		2.7E-04	HEATED CANISTER	FID
BENZENE		BSWML1		1.2E-04	HEATED CANISTER	FID
BENZENE		BSWML2		7.6E-05	HEATED CANISTER	FID
BENZENE		BSWIA1		ND[2.4E-02]	HEATED CANISTER	FID
BENZENE		BSWID1		ND[5.9E-02]	HEATED CANISTER	FID
BENZENE		BSWID2		ND[8.6E-02]	HEATED CANISTER	FID
BENZENE		BSWIE1		ND[6.8E-02]	HEATED CANISTER	FID
BENZENE		BSWIE2		ND[3.6E-02]	HEATED CANISTER	FID
BENZENE		BSWIF		ND[1.4E-02]	HEATED CANISTER	FID
BENZENE		BSWIG1		ND[2.8E-02]	HEATED CANISTER	FID
BENZENE		BSWIG2		ND[3.3E-02]	HEATED CANISTER	FID
BENZENE		BSWIH1		ND[3.9E-02]	HEATED CANISTER	FID
BENZENE		BSWIH2		ND[4.6E-02]	HEATED CANISTER	FID
BENZENE		BSWIJ1		ND[2.0E-02]	HEATED CANISTER	FID
BENZENE		BSWIJ2		ND[1.7E-02]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN*		
24	6		ND to 2.7E-04	4.7E-06		
DIFFUSION, PRESSURE, BELT & COMPACTION BAFFLE WASHERS						
BENZENE		BSWMG1		1.2E-05	HEATED CANISTER	FID
BENZENE		BSWMG2		1.0E-05	HEATED CANISTER	FID
BENZENE		BSWMM		2.1E-04	HEATED CANISTER	FID
BENZENE		BSWMO1		ND[1.4E-05]	HEATED CANISTER	FID
BENZENE		BSWMO2		ND[1.5E-05]	HEATED CANISTER	FID
BENZENE		BSWMF		8.3E-07	HEATED CANISTER	FID
BENZENE		BSWIA2		ND[3.1E-03]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
7	4		ND to 2.1E-04	8.3E-07		
VACUUM DRUM WASHERS						
BROMODICHLOROMETHANE		BSWG1		ND[0.015]	M18	
BROMODICHLOROMETHANE		BSWG2		ND[0 ppb]	VOST	
BROMODICHLOROMETHANE		BSWH		ND[0.057]	M18	
BROMODICHLOROMETHANE		BSWJ		ND[0.021]	M18	
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
4	0		ND	ND		
VACUUM DRUM WASHERS						
CARBON DISULFIDE		BSWG1	5 ppb	3.0E-05	VOST	
CARBON DISULFIDE		BSWG2	8 ppb	6.0E-05	VOST	
CARBON DISULFIDE		BSWH		ND[0.019]	M16	
CARBON DISULFIDE		BSWJ		ND[0.006]	M16	
CARBON DISULFIDE		BSWA1	ND to 0.039	2.5E-02	M16	
CARBON DISULFIDE		BSWG1		ND[1.3E-03]	M16	
CARBON DISULFIDE		BSWG2		ND[2.7E-03]	M16	
CARBON DISULFIDE		BSWIJ1		ND[8.5E-03]	M16	
CARBON DISULFIDE		BSWIJ2		ND[6.0E-03]	M16	
NO. OF TESTS	DETECTS		RANGE	MEDIAN*		
9	3		ND to 3.9-02	1.9E-07		

TABLE 5 SUMMARY OF 'AIR TOXIC' EMISSIONS FROM BROWNSTOCK WASHERS, CONTD.

VOLATILE ORGANIC COMPOUND		MILL CODE	EMISSIONS RANGE lb/ADTUBP	AVG lb/ADTUBP	TEST METHOD	COMMENTS
VACUUM DRUM WASHERS						
CARBON TETRACHLORIDE		BSWMA1		ND[4.2E-4]	HEATED CANISTER	FID
CARBON TETRACHLORIDE		BSWMA2		5.2E-04	HEATED CANISTER	FID
CARBON TETRACHLORIDE		BSWMH1		1.5E-03	HEATED CANISTER	FID, U
CARBON TETRACHLORIDE		BSWMH2		3.1E-03	HEATED CANISTER	FID, U
CARBON TETRACHLORIDE		BSWML1		ND[1.3E-03]	HEATED CANISTER	FID
CARBON TETRACHLORIDE		BSWML2		ND[1.1E-03]	HEATED CANISTER	FID
CARBON TETRACHLORIDE		BSWIA1		ND[4.7E-02]	HEATED CANISTER	FID
CARBON TETRACHLORIDE		BSWID1	0.060 to 0.283	1.6E-01	HEATED CANISTER	FID; suspicious data
CARBON TETRACHLORIDE		BSWID2		ND[1.7E-01]	HEATED CANISTER	FID
CARBON TETRACHLORIDE		BSWIE1		ND[1.3E-01]	HEATED CANISTER	FID
CARBON TETRACHLORIDE		BSWIE2		ND[7.1E-02]	HEATED CANISTER	FID
CARBON TETRACHLORIDE		BSWIF		ND[2.8E-02]	HEATED CANISTER	FID
CARBON TETRACHLORIDE		BSWIG1		ND[5.5E-02]	HEATED CANISTER	FID
CARBON TETRACHLORIDE		BSWIG2		ND[6.5E-02]	HEATED CANISTER	FID
CARBON TETRACHLORIDE		BSWIH1		ND[7.7E-02]	HEATED CANISTER	FID
CARBON TETRACHLORIDE		BSWIH2	ND to 0.061	4.8E-02	HEATED CANISTER	FID
CARBON TETRACHLORIDE		BSWIJ1		ND[3.9E-02]	HEATED CANISTER	FID
CARBON TETRACHLORIDE		BSWIJ2	ND to 0.033	2.5E-02	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN*		
16	6		ND to 2.8E-01	9.0E-05		
DIFFUSION, PRESSURE, BELT & COMPACTION BAFFLE WASHERS						
CARBON TETRACHLORIDE		BSWMG1		ND[2.4E-04]	HEATED CANISTER	FID
CARBON TETRACHLORIDE		BSWMG2		ND[7.0E-05]	HEATED CANISTER	FID
CARBON TETRACHLORIDE		BSWMM		1.5E-02	HEATED CANISTER	FID, U
CARBON TETRACHLORIDE		BSWMO1		ND[3.0E-04]	HEATED CANISTER	FID, U
CARBON TETRACHLORIDE		BSWMO2		ND[3.4E-04]	HEATED CANISTER	FID
CARBON TETRACHLORIDE		BSWMF		ND[2.2E-05]	HEATED CANISTER	FID
CARBON TETRACHLORIDE		BSWIA2		ND[6.2E-03]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN**		
7	1		ND to 1.5E-02	5.1E-04		
VACUUM DRUM WASHERS						
CARBONYL SULFIDE		BSWIA1		ND[2.8E-02]	M16	
CARBONYL SULFIDE		BSWIG1		ND[3.2E-03]	M16	
CARBONYL SULFIDE		BSWIG2		ND[6.3E-03]	M16	
CARBONYL SULFIDE		BSWIJ1		ND[1.2E-02]	M16	
CARBONYL SULFIDE		BSWIJ2		ND[8.2E-03]	M16	
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
5	0		ND	ND		
VACUUM DRUM WASHERS						
3-CARENE		BSWG1		ND[0.008]	M18	
3-CARENE		BSWG2		ND[0.006]	M18	
3-CARENE		BSWH		ND[0.019]	M18	
3-CARENE		BSWJ		ND[0.009]	M18	
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
4	0		ND	ND		
VACUUM DRUM WASHERS						
CHLOROBENZENE		BSWMA1		1.6E-05	HEATED CANISTER	FID
CHLOROBENZENE		BSWMA2		3.2E-05	HEATED CANISTER	FID
CHLOROBENZENE		BSWMH1		9.1E-05	HEATED CANISTER	FID, U
CHLOROBENZENE		BSWMH2		1.9E-04	HEATED CANISTER	FID, U
CHLOROBENZENE		BSWML1		ND[8.2E-05]	HEATED CANISTER	FID
CHLOROBENZENE		BSWML2		3.7E-05	HEATED CANISTER	FID, U
CHLOROBENZENE		BSWIA1		ND[3.4E-02]	HEATED CANISTER	FID
CHLOROBENZENE		BSWID1	ND to 0.147	7.2E-02	HEATED CANISTER	FID; suspicious data
CHLOROBENZENE		BSWID2		ND[1.3E-01]	HEATED CANISTER	FID
CHLOROBENZENE		BSWIE1		ND[9.8E-02]	HEATED CANISTER	FID
CHLOROBENZENE		BSWIE2		ND[5.2E-02]	HEATED CANISTER	FID
CHLOROBENZENE		BSWIF		ND[2.1E-02]	HEATED CANISTER	FID
CHLOROBENZENE		BSWIG1		ND[4.0E-02]	HEATED CANISTER	FID
CHLOROBENZENE		BSWIG2		ND[4.8E-02]	HEATED CANISTER	FID
CHLOROBENZENE		BSWIH1		ND[5.6E-02]	HEATED CANISTER	FID

TABLE 5 SUMMARY OF 'AIR TOXIC' EMISSIONS FROM BROWNSTOCK WASHERS, CONTD.

VOLATILE ORGANIC COMPOUND		MILL CODE	EMISSIONS RANGE lb/ADTUBP	EMISSIONS AVG lb/ADTUBP	TEST METHOD	COMMENTS
CHLOROBENZENE		BSWIH2		ND[8.6E-02]	HEATED CANISTER	FID
CHLOROBENZENE		BSWIJ1		ND[2.6E-02]	HEATED CANISTER	FID
CHLOROBENZENE		BSWIJ2		ND[2.6E-02]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN*		
19	6		ND to 1.5E-01	3.7E-07		
DIFFUSION, PRESSURE, BELT & COMPACTION BAFFLE WASHERS						
CHLOROBENZENE		BSWMG1		ND[1.5E-05]	HEATED CANISTER	FID
CHLOROBENZENE		BSWMG2		3.3E-06	HEATED CANISTER	FID, U
CHLOROBENZENE		BSWMM		1.8E-03	HEATED CANISTER	FID, U
CHLOROBENZENE		BSWMO1		ND[1.8E-05]	HEATED CANISTER	FID, U
CHLOROBENZENE		BSWMO2		ND[2.0E-05]	HEATED CANISTER	FID
CHLOROBENZENE		BSWMF		ND[1.2E-06]	HEATED CANISTER	FID
CHLOROBENZENE		BSWIA2		ND[4.5E-03]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN**		
7	2		ND to 1.8E-03	5.1E-07		
VACUUM DRUM WASHERS						
CHLOROFORM		BSWG1	23 ppb	2.2E-04	VOST	
CHLOROFORM		BSWG2	49 ppb	5.8E-04	VOST	
CHLOROFORM		BSWH		ND[0.038]	M18	
CHLOROFORM		BSWJ	112 ppb	1.9E-03	VOST	
CHLOROFORM		BSWMA1		6.3E-04	HEATED CANISTER	FID
CHLOROFORM		BSWMA2		1.4E-02	HEATED CANISTER	FID
CHLOROFORM		BSWMH1		2.4E-03	HEATED CANISTER	FID, U
CHLOROFORM		BSWMH2		2.5E-03	HEATED CANISTER	FID, U
CHLOROFORM		BSWML1		ND[1.0E-03]	HEATED CANISTER	FID
CHLOROFORM		BSWML2		ND[8.2E-04]	HEATED CANISTER	FID
CHLOROFORM		BSWIA1		ND[7.3E-02]	HEATED CANISTER	FID
CHLOROFORM		BSWID1		ND[1.8E-01]	HEATED CANISTER	FID
CHLOROFORM		BSWID2		ND[2.8E-01]	HEATED CANISTER	FID
CHLOROFORM		BSWIE1		ND[2.1E-01]	HEATED CANISTER	FID
CHLOROFORM		BSWIE2		ND[1.1E-01]	HEATED CANISTER	FID
CHLOROFORM		BSWIF	ND to 0.045	2.3E-02	HEATED CANISTER	FID
CHLOROFORM		BSWIG1		ND[8.5E-02]	HEATED CANISTER	FID
CHLOROFORM		BSWIG2		ND[1.0E-01]	HEATED CANISTER	FID
CHLOROFORM		BSWIH1		ND[1.2E-01]	HEATED CANISTER	FID
CHLOROFORM		BSWIH2		ND[1.4E-01]	HEATED CANISTER	FID
CHLOROFORM		BSWIJ1		ND[6.1E-02]	HEATED CANISTER	FID
CHLOROFORM		BSWIJ2		ND[5.2E-02]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN*		
22	8		ND to 4.5E-02	1.0E-04		
DIFFUSION, PRESSURE, BELT & COMPACTION BAFFLE WASHERS						
CHLOROFORM		BSWMG1		ND[1.8E-04]	HEATED CANISTER	FID
CHLOROFORM		BSWMG2		ND[5.4E-05]	HEATED CANISTER	FID
CHLOROFORM		BSWMM		ND[6.0E-04]	HEATED CANISTER	FID
CHLOROFORM		BSWMO1		ND[2.4E-04]	HEATED CANISTER	FID
CHLOROFORM		BSWMO2		2.5E-04	HEATED CANISTER	FID, U
CHLOROFORM		BSWMF		ND[1.6E-6]	HEATED CANISTER	FID
CHLOROFORM		BSWIA2		ND[9.6E-03]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN**		
7	1		ND to 2.5E-04	8.5E-06		
VACUUM DRUM WASHERS						
CHLOROMETHANE		BSWG1	14 ppb	5.6E-05	VOST	
CHLOROMETHANE		BSWG2	4 ppb	2.0E-05	VOST	
CHLOROMETHANE		BSWJ	485 ppb	3.4E-03	VOST	
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
3	3		2.0E-05 to 3.4E-03	5.6E-05		
VACUUM DRUM WASHERS						
o-CRESOL		BSWIA1		ND[3.3E-02]	HEATED CANISTER	FID
o-CRESOL		BSWID1	ND to 0.084	4.2E-02	HEATED CANISTER	FID
o-CRESOL		BSWID2		ND[1.2E-01]	HEATED CANISTER	FID

TABLE 5 SUMMARY OF 'AIR TOXIC' EMISSIONS FROM BROWNSTOCK WASHERS, CONTD.

VOLATILE ORGANIC COMPOUND		MILL CODE	EMISSIONS RANGE lb/ADTUBP	EMISSIONS AVG lb/ADTUBP	TEST METHOD	COMMENTS
o-CRESOL		BSWIE1		ND[9.4E-02]	HEATED CANISTER	FID
o-CRESOL		BSWIE2		ND[5.0E-02]	HEATED CANISTER	FID
o-CRESOL		BSWIF		ND[2.0E-02]	HEATED CANISTER	FID
o-CRESOL		BSWIG1		ND[3.8E-02]	HEATED CANISTER	FID
o-CRESOL		BSWIG2		ND[4.6E-02]	HEATED CANISTER	FID
o-CRESOL		BSWIH1		ND[5.4E-02]	HEATED CANISTER	FID
o-CRESOL		BSWIH2	ND to 0.054	3.7E-02	HEATED CANISTER	FID
o-CRESOL		BSWIJ1	0.083 to 0.216	1.4E-01	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN*		
11	3		ND to 2.2E-01	9.9E-03		
DIFFUSION, PRESSURE, BELT & COMPACTION BAFFLE WASHERS						
o-CRESOL		BSWIA2		ND[4.3E-03]	HEATED CANISTER	FID
VACUUM DRUM WASHERS						
CROTONALDEHYDE		BSWID1		ND[1.5E-03]	RTI DRAFT	DNPH
CROTONALDEHYDE		BSWID2	ND to 2.0E-03	1.1E-03	RTI DRAFT	DNPH
CROTONALDEHYDE		BSWIE1		ND[1.3E-03]	RTI DRAFT	DNPH
CROTONALDEHYDE		BSWIE2		ND[6.8E-04]	RTI DRAFT	DNPH
CROTONALDEHYDE		BSWIF		ND[2.7E-04]	RTI DRAFT	DNPH
CROTONALDEHYDE		BSWIG1		ND[4.0E-04]	RTI DRAFT	DNPH
CROTONALDEHYDE		BSWIG2	ND to 0.0005	3.0E-04	RTI DRAFT	DNPH
CROTONALDEHYDE		BSWIH1		ND[5.9E-04]	RTI DRAFT	DNPH
CROTONALDEHYDE		BSWIH2	ND to 0.0004	2.7E-04	RTI DRAFT	DNPH
CROTONALDEHYDE		BSWIJ1	ND to 0.0005	2.4E-04	RTI DRAFT	DNPH
NO. OF TESTS	DETECTS		RANGE	MEDIAN*		
10	4		ND to 2.0E-03	1.2E-04		
VACUUM DRUM WASHERS						
CUMENE		BSWG1		ND[0.004]	M18	
CUMENE		BSWG2		ND[0.006]	M18	
CUMENE		BSWH		ND[0.019]	M18	
CUMENE		BSWJ		ND[0.009]	M18	
CUMENE		BSWIA1		ND[0.036]	HEATED CANISTER	FID
CUMENE		BSWID1		ND[0.110]	HEATED CANISTER	FID
CUMENE		BSWID2		ND[0.073]	HEATED CANISTER	FID
CUMENE		BSWIE1		ND[0.104]	HEATED CANISTER	FID
CUMENE		BSWIE2		ND[0.055]	HEATED CANISTER	FID
CUMENE		BSWIF		ND[0.022]	HEATED CANISTER	FID
CUMENE		BSWIG1		ND[0.043]	HEATED CANISTER	FID
CUMENE		BSWIG2		ND[0.051]	HEATED CANISTER	FID
CUMENE		BSWIH1		ND[0.119]	HEATED CANISTER	FID
CUMENE		BSWIH2		ND[0.071]	HEATED CANISTER	FID
CUMENE		BSWIJ1		ND[0.031]	HEATED CANISTER	FID
CUMENE		BSWIJ2		ND[0.027]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
16	0		ND	ND		
DIFFUSION, PRESSURE, BELT & COMPACTION BAFFLE WASHERS						
CUMENE		BSWIA2		ND[4.8E-03]	HEATED CANISTER	FID
VACUUM DRUM WASHERS						
CYCLOHEXANONE		BSWID1		ND[2.1E-03]	RTI DRAFT	DNPH
CYCLOHEXANONE		BSWID2		ND[1.9E-03]	RTI DRAFT	DNPH
CYCLOHEXANONE		BSWIE1		ND[1.8E-03]	RTI DRAFT	DNPH
CYCLOHEXANONE		BSWIE2		ND[9.5E-04]	RTI DRAFT	DNPH
CYCLOHEXANONE		BSWIF	0.0006 to 0.0021	1.1E-03	RTI DRAFT	DNPH
CYCLOHEXANONE		BSWIG1		ND[5.6E-04]	RTI DRAFT	DNPH
CYCLOHEXANONE		BSWIG2		ND[5.5E-04]	RTI DRAFT	DNPH
NO. OF TESTS	DETECTS		RANGE	MEDIAN**		
7	1		ND to 0.0021	3.7E-05		
VACUUM DRUM WASHERS						
p-CYMENE		BSWG1	-	1.5E-02	M18	
p-CYMENE		BSWG2	-	7.6E-03	M18	
p-CYMENE		BSWH		ND[0.019]	M18	

TABLE 5 SUMMARY OF 'AIR TOXIC' EMISSIONS FROM BROWNSTOCK WASHERS, CONTD.

VOLATILE ORGANIC COMPOUND		MILL CODE	EMISSIONS RANGE lb/ADTUBP	AVG lb/ADTUBP	TEST METHOD	COMMENTS
p-CYMENE		BSWJ		ND[0.009]	M18	
NO. OF TESTS	DETECTS		RANGE	MEDIAN*		
4	2		ND to 1.8E-02	3.6E-03		
VACUUM DRUM WASHERS						
DIBROMOMETHANE		BSWG2		ND[0 ppb]	VOST	
DIBROMOMETHANE		BSWH		ND[0 ppb]	VOST	
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
2	0		ND	ND[0 ppb]		
VACUUM DRUM WASHERS						
1,2-DICHLOROETHANE		BSWMA1		5.9E-05	HEATED CANISTER	FID
1,2-DICHLOROETHANE		BSWMA2		1.1E-04	HEATED CANISTER	FID
1,2-DICHLOROETHANE		BSWMH1		ND[5.0E-04]	HEATED CANISTER	FID
1,2-DICHLOROETHANE		BSWMH2		6.2E-04	HEATED CANISTER	FID, U
1,2-DICHLOROETHANE		BSWML1		ND[2.8E-04]	HEATED CANISTER	FID
1,2-DICHLOROETHANE		BSWML2		ND[2.2E-04]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN*		
6	3		ND to 6.2E-04	3.3E-05		
DIFFUSION, PRESSURE, BELT & COMPACTION BAFFLE WASHERS						
1,2-DICHLOROETHANE		BSWMG1		ND[5.0E-05]	HEATED CANISTER	FID
1,2-DICHLOROETHANE		BSWMG2		ND[1.5E-05]	HEATED CANISTER	FID
1,2-DICHLOROETHANE		BSWMM		3.0E-03	HEATED CANISTER	FID, U
1,2-DICHLOROETHANE		BSWMO1		ND[6.4E-05]	HEATED CANISTER	FID, U
1,2-DICHLOROETHANE		BSWMO2		ND[7.4E-05]	HEATED CANISTER	FID
1,2-DICHLOROETHANE		BSWMF		ND[4.8E-6]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN*		
6	1		ND to 3.0E-03	1.2E-04		
VACUUM DRUM WASHERS						
1,2-DICHLOROETHYLENE		BSWMA1		7.8E-05	HEATED CANISTER	FID
1,2-DICHLOROETHYLENE		BSWMA2		7.5E-03	HEATED CANISTER	FID
1,2-DICHLOROETHYLENE		BSWMH1		2.8E-04	HEATED CANISTER	FID, U
1,2-DICHLOROETHYLENE		BSWMH2		8.4E-04	HEATED CANISTER	FID
1,2-DICHLOROETHYLENE		BSWML1		ND[2.0E-04]	HEATED CANISTER	FID
1,2-DICHLOROETHYLENE		BSWML2		ND[1.7E-04]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN*		
6	4		ND to 7.5E-03	1.4E-04		
DIFFUSION, PRESSURE, BELT & COMPACTION BAFFLE WASHERS						
1,2-DICHLOROETHYLENE		BSWMG1		4.9E-05	HEATED CANISTER	FID, U
1,2-DICHLOROETHYLENE		BSWMG2		ND[1.1E-05]	HEATED CANISTER	FID
1,2-DICHLOROETHYLENE		BSWMM		9.1E-03	HEATED CANISTER	FID, U
1,2-DICHLOROETHYLENE		BSWMO1		6.3E-05	HEATED CANISTER	FID, U
1,2-DICHLOROETHYLENE		BSWMO2		ND[5.4E-05]	HEATED CANISTER	FID
1,2-DICHLOROETHYLENE		BSWMF		ND[3.4E-06]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
7	4		ND to 9.1E-03	2.5E-05		
VACUUM DRUM WASHERS						
DIMETHYL DISULFIDE		BSWG1	315 ppb	2.4E-03	VOST	
DIMETHYL DISULFIDE		BSWG2	289 ppb	2.7E-03	VOST	
DIMETHYL DISULFIDE		BSWH	1.2 to 1.4 lb/hr	1.2E-01	M16	
DIMETHYL DISULFIDE		BSWJ	ND to 0.012	9.0E-03	M16	
DIMETHYL DISULFIDE		BSWMH1		4.9E-03	HEATED CANISTER	FID
DIMETHYL DISULFIDE		BSWMH2		1.2E-02	HEATED CANISTER	FID
DIMETHYL DISULFIDE		BSWML1		4.4E-02	HEATED CANISTER	FID
DIMETHYL DISULFIDE		BSWML2		5.3E-03	HEATED CANISTER	FID
DIMETHYL DISULFIDE		BSWIA1	0.034 to 0.182	9.0E-02	HEATED CANISTER	FID
DIMETHYL DISULFIDE		BSWID1	0.046 to 0.119	6.8E-02	HEATED CANISTER	FID
DIMETHYL DISULFIDE		BSWID2	ND to 0.143	9.2E-02	HEATED CANISTER	FID
DIMETHYL DISULFIDE		BSWIE1	0.048 to 0.194	1.0E-01	HEATED CANISTER	FID
DIMETHYL DISULFIDE		BSWIE2	0.029 to 0.184	1.1E-01	HEATED CANISTER	FID

TABLE 5 SUMMARY OF 'AIR TOXIC' EMISSIONS FROM BROWNSTOCK WASHERS, CONTD.

VOLATILE ORGANIC COMPOUND		MILL CODE	EMISSIONS RANGE lb/ADTUBP	EMISSIONS AVG lb/ADTUBP	TEST METHOD	COMMENTS
DIMETHYL DISULFIDE		BSWIF	0.011 to 0.029	1.7E-02	HEATED CANISTER	FID
DIMETHYL DISULFIDE		BSWIG1	0.022 to 0.058	3.5E-02	HEATED CANISTER	FID
DIMETHYL DISULFIDE		BSWIG2	0.082 to 0.120	9.5E-02	HEATED CANISTER	FID
DIMETHYL DISULFIDE		BSWIH1	0.252 to 0.324	2.8E-01	HEATED CANISTER	FID
DIMETHYL DISULFIDE		BSWIH2	0.327 to 0.470	3.3E-01	HEATED CANISTER	FID
DIMETHYL DISULFIDE		BSWIJ1	0.098 to 0.203	1.5E-01	HEATED CANISTER	FID
DIMETHYL DISULFIDE		BSWIJ2	0.057 to 0.080	6.9E-02	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
20	20		ND to 4.7E-01	6.9E-02		
DIFFUSION, PRESSURE, BELT & COMPACTION BAFFLE WASHERS						
DIMETHYL DISULFIDE		BSWMF		ND[5.6E-5]	HEATED CANISTER	FID
DIMETHYL DISULFIDE		BSWMG1		2.7E-02	HEATED CANISTER	FID
DIMETHYL DISULFIDE		BSWMG2		1.6E-02	HEATED CANISTER	FID
DIMETHYL DISULFIDE		BSWMM		7.1E-02	HEATED CANISTER	FID
DIMETHYL DISULFIDE		BSWMO1		1.7E-03	HEATED CANISTER	FID
DIMETHYL DISULFIDE		BSWMO2		1.9E-03	HEATED CANISTER	FID
DIMETHYL DISULFIDE		BSWIA2		ND[3.8E-03]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
7	5		ND to 7.1E-02	1.9E-03		
VACUUM DRUM WASHERS						
DIMETHYL SULFIDE		BSWG1	523 ppb	2.6E-03	VOST	
DIMETHYL SULFIDE		BSWG2	-	1.5E-02	M16	
DIMETHYL SULFIDE		BSWH	1.4 to 2.0 lb/hr	1.6E-01	M16	
DIMETHYL SULFIDE		BSWJ	ND to 0.015	9.0E-03	M16	
DIMETHYL SULFIDE		BSWMH1		3.5E-02	HEATED CANISTER	FID
DIMETHYL SULFIDE		BSWMH2		1.0E-02	HEATED CANISTER	FID
DIMETHYL SULFIDE		BSWML1		6.5E-01	HEATED CANISTER	FID
DIMETHYL SULFIDE		BSWML2		1.0E-01	HEATED CANISTER	FID
DIMETHYL SULFIDE		BSWIA1	0.023 to 0.349	2.3E-01	HEATED CANISTER	FID
DIMETHYL SULFIDE		BSWID1	0.810 to 1.529	1.2E+00	HEATED CANISTER	FID
DIMETHYL SULFIDE		BSWID2	1.160 to 1.609	1.4E+00	HEATED CANISTER	FID
DIMETHYL SULFIDE		BSWIE1	0.193 to 0.532	3.5E-01	HEATED CANISTER	FID
DIMETHYL SULFIDE		BSWIE2	0.101 to 0.309	2.3E-01	HEATED CANISTER	FID
DIMETHYL SULFIDE		BSWIF	0.010 to 0.021	1.3E-02	HEATED CANISTER	FID
DIMETHYL SULFIDE		BSWIG1	0.015 to 0.037	2.1E-02	HEATED CANISTER	FID
DIMETHYL SULFIDE		BSWIG2	0.034 to 0.057	4.2E-02	HEATED CANISTER	FID
DIMETHYL SULFIDE		BSWIH1	0.641 to 0.712	6.8E-01	HEATED CANISTER	FID
DIMETHYL SULFIDE		BSWIH2	0.873 to 2.320	1.2E+00	HEATED CANISTER	FID
DIMETHYL SULFIDE		BSWIJ1	0.052 to 0.168	1.1E-01	HEATED CANISTER	FID
DIMETHYL SULFIDE		BSWIJ2	0.341 to 0.389	3.6E-01	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
20	20		ND to 2.3E+00	1.4E-01		
DIFFUSION, PRESSURE, BELT & COMPACTION BAFFLE WASHERS						
DIMETHYL SULFIDE		BSWMG1		4.6E-02	HEATED CANISTER	FID
DIMETHYL SULFIDE		BSWMG2		1.5E-02	HEATED CANISTER	FID
DIMETHYL SULFIDE		BSWMM		1.1E+00	HEATED CANISTER	FID
DIMETHYL SULFIDE		BSWMO1		1.2E-02	HEATED CANISTER	FID
DIMETHYL SULFIDE		BSWMO2		1.0E-02	HEATED CANISTER	FID
DIMETHYL SULFIDE		BSWMF		ND[3.6E-5]	HEATED CANISTER	FID
DIMETHYL SULFIDE		BSWIA2	0.041 to 0.053	4.7E-02	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
7	6		ND to 1.1E-00	1.5E-02		
VACUUM DRUM WASHERS						
ETHANOL		BSWG1		ND[0.004]	M18	
ETHANOL		BSWG2		ND[0.003]	M18	
ETHANOL		BSWH		ND[0.019]	M18	
ETHANOL		BSWI1	0.006 to 0.016	1.1E-02	M18	
ETHANOL		BSWI2		ND[0.0036]	M18	
ETHANOL		BSWJ	0.003 to 0.006	6.0E-03	M18	
ETHANOL		BSWIA1	ND to 0.023	1.2E-02	HEATED CANISTER	FID
ETHANOL		BSWID1	0.018 to 0.051	2.9E-02	HEATED CANISTER	FID
ETHANOL		BSWID2	ND to 0.059	3.0E-02	HEATED CANISTER	FID

TABLE 5 SUMMARY OF 'AIR TOXIC' EMISSIONS FROM BROWNSTOCK WASHERS, CONTD.

VOLATILE ORGANIC COMPOUND		MILL CODE	EMISSIONS RANGE lb/ADTUBP	AVG lb/ADTUBP	TEST METHOD	COMMENTS
ETHANOL		BSWIE1	0.028 to 0.070	4.3E-02	HEATED CANISTER	FID
ETHANOL		BSWIE2	0.028 to 0.045	3.7E-02	HEATED CANISTER	FID
ETHANOL		BSWIF	ND to 0.059	4.4E-03	HEATED CANISTER	FID
ETHANOL		BSWIG1		ND[0.019]	HEATED CANISTER	FID
ETHANOL		BSWIG2		ND[0.019]	HEATED CANISTER	FID
ETHANOL		BSWIH1		ND[0.023]	HEATED CANISTER	FID
ETHANOL		BSWIH2	ND to 0.022	1.4E-02	HEATED CANISTER	FID
ETHANOL		BSWIJ1	0.009 to 0.019	1.4E-02	HEATED CANISTER	FID
ETHANOL		BSWIJ2	0.013 to 0.018	1.6E-02	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
16	9		ND to 7.0E-02	8.7E-03		
DIFFUSION, PRESSURE, BELT & COMPACTION BAFFLE WASHERS						
ETHANOL		BSWIA2		ND[1.9E-03]	HEATED CANISTER	FID
VACUUM DRUM WASHERS						
ETHYL BENZENE		BSWG1		ND[0 ppb]	VOST	
ETHYL BENZENE		BSWG2		ND[0 ppb]	VOST	
ETHYL BENZENE		BSWH		ND[0.019]	M18	
ETHYL BENZENE		BSWH1		ND[0.0032]	M18	
ETHYL BENZENE		BSWH2		ND[0.0036]	M18	
ETHYL BENZENE		BSWJ		ND[0.008]	M18	
ETHYL BENZENE		BSWIA1		ND[0.032]	HEATED CANISTER	FID
ETHYL BENZENE		BSWID1	ND to 0.199	8.7E-02	HEATED CANISTER	FID
ETHYL BENZENE		BSWID2		ND[0.118]	HEATED CANISTER	FID
ETHYL BENZENE		BSWIE1		ND[0.092]	HEATED CANISTER	FID
ETHYL BENZENE		BSWIE2		ND[0.049]	HEATED CANISTER	FID
ETHYL BENZENE		BSWIH1		ND[0.053]	HEATED CANISTER	FID
ETHYL BENZENE		BSWIH2		ND[0.063]	HEATED CANISTER	FID
ETHYL BENZENE		BSWIJ1		ND[0.027]	HEATED CANISTER	FID
ETHYL BENZENE		BSWIJ2		ND[0.023]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN**		
15	1		ND to 0.199	1.2E-03		
DIFFUSION, PRESSURE, BELT & COMPACTION BAFFLE WASHERS						
ETHYL BENZENE		BSWIA2		ND[0.0043]	HEATED CANISTER	FID
VACUUM DRUM WASHERS						
FORMALDEHYDE		BSWMA1		4.0E-03	NMIT	NCASI IMPINGER METHOD
FORMALDEHYDE		BSWMA2		1.3E-04	NMIT	NCASI IMPINGER METHOD
FORMALDEHYDE		BSWML1		4.6E-03	NMIT	NCASI IMPINGER METHOD
FORMALDEHYDE		BSWML2		4.3E-03	NMIT	NCASI IMPINGER METHOD
FORMALDEHYDE		BSWID1	0.0021 to 0.0023	2.2E-03	RTI DRAFT	DNPH
FORMALDEHYDE		BSWD2	0.0052 to 0.0461	2.1E-02	RTI DRAFT	DNPH
FORMALDEHYDE		BSWE1	ND to 0.0012	6.7E-04	RTI DRAFT	DNPH
FORMALDEHYDE		BSWE2		ND[2.9E-04]	RTI DRAFT	DNPH
FORMALDEHYDE		BSWIF	0.0003 to 0.0011	6.3E-04	RTI DRAFT	DNPH
FORMALDEHYDE		BSWIG1	0.0013 to 0.0018	1.6E-03	RTI DRAFT	DNPH
FORMALDEHYDE		BSWG2	0.0019 to 0.0175	7.2E-03	RTI DRAFT	DNPH
FORMALDEHYDE		BSWIH1		ND[5.1E-04]	RTI DRAFT	DNPH
FORMALDEHYDE		BSWIH2	0.0004 to 0.0094	3.7E-03	RTI DRAFT	DNPH
FORMALDEHYDE		BSWIJ1		ND[2.4E-04]	RTI DRAFT	DNPH
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
14	11		ND to 4.6E-02	1.9E-03		
DIFFUSION, PRESSURE, BELT & COMPACTION BAFFLE WASHERS						
FORMALDEHYDE		BSWMG1		ND[1.3E-04]	NMIT	NCASI IMPINGER METHOD
FORMALDEHYDE		BSWMG2		ND[4.6E-05]	NMIT	NCASI IMPINGER METHOD
FORMALDEHYDE		BSWMM		7.5E-04	NMIT	NCASI IMPINGER METHOD
FORMALDEHYDE		BSWMO1		ND[2.8E-04]	NMIT	NCASI IMPINGER METHOD
FORMALDEHYDE		BSWMO2		ND[4.0E-04]	NMIT	NCASI IMPINGER METHOD
FORMALDEHYDE		BSWMF		1.1E-04	NMIT	NCASI IMPINGER METHOD
NO. OF TESTS	DETECTS		RANGE	MEDIAN**		
6	2		ND to 7.5E-04	2.9E-05		
VACUUM DRUM WASHERS						

TABLE 5 SUMMARY OF 'AIR TOXIC' EMISSIONS FROM BROWNSTOCK WASHERS, CONTD.

VOLATILE ORGANIC COMPOUND		MILL CODE	EMISSIONS RANGE lb/ADTUBP	EMISSIONS AVG lb/ADTUBP	TEST METHOD	COMMENTS
HEXACHLOROCYCLOPENTIDIEN		BSWIF		ND[5.0E-02]	HEATED CANISTER	FID
HEXACHLOROCYCLOPENTIDIEN		BSWIG1		ND[9.7E-02]	HEATED CANISTER	FID
HEXACHLOROCYCLOPENTIDIEN		BSWIG2		ND[1.2E-01]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
3	0		ND	ND		
VACUUM DRUM WASHERS						
HEXACHLOROETHANE		BSWIF		ND[4.3E-02]	HEATED CANISTER	FID
HEXACHLOROETHANE		BSWIG1		ND[8.4E-02]	HEATED CANISTER	FID
HEXACHLOROETHANE		BSWIG2		ND[1.0E-01]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
3	0		ND	ND		
VACUUM DRUM WASHERS						
n-HEXANE		BSWG1	38 ppb	2.7E-04	VOST	
n-HEXANE		BSWG2	126 ppb	1.1E-03	VOST	
n-HEXANE		BSWJ	1 ppb	1.2E-05	VOST	
n-HEXANE		BSWML1		2.8E-04	HEATED CANISTER	FID
n-HEXANE		BSWML2		1.5E-04	HEATED CANISTER	FID
n-HEXANE		BSWIA1		ND[2.6E-02]	HEATED CANISTER	FID
n-HEXANE		BSWID1		ND[6.5E-02]	HEATED CANISTER	FID
n-HEXANE		BSWID2		ND[9.5E-02]	HEATED CANISTER	FID
n-HEXANE		BSWIE1		ND[7.5E-02]	HEATED CANISTER	FID
n-HEXANE		BSWIE2		ND[4.0E-02]	HEATED CANISTER	FID
n-HEXANE		BSWIF		ND[1.6E-02]	HEATED CANISTER	FID
n-HEXANE		BSWIG1		ND[3.1E-02]	HEATED CANISTER	FID
n-HEXANE		BSWIG2		ND[3.6E-02]	HEATED CANISTER	FID
n-HEXANE		BSWIH1		ND[4.3E-02]	HEATED CANISTER	FID
n-HEXANE		BSWIH2		ND[5.1E-02]	HEATED CANISTER	FID
n-HEXANE		BSWIJ1		ND[2.2E-02]	HEATED CANISTER	FID
n-HEXANE		BSWIJ2		ND[1.9E-02]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN*		
17	5		ND to 1.1E-03	5.3E-06		
DIFFUSION, PRESSURE, BELT & COMPACTION BAFFLE WASHERS						
n-HEXANE		BSWMG1		1.2E-04	HEATED CANISTER	FID
n-HEXANE		BSWMG2		1.1E-04	HEATED CANISTER	FID
n-HEXANE		BSWMM		8.1E-03	HEATED CANISTER	FID
n-HEXANE		BSWMO1		9.1E-05	HEATED CANISTER	FID
n-HEXANE		BSWMO2		6.5E-05	HEATED CANISTER	FID
n-HEXANE		BSWIA2		ND[3.5E-03]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
6	5		ND to 8.1E-03	1.0E-04		
VACUUM DRUM WASHERS						
HYDROGEN SULFIDE		BSWG1		ND[0.004]	M16	
HYDROGEN SULFIDE		BSWG2		3.0E-03	M16	
HYDROGEN SULFIDE		BSWH		3.8E-02	M16	
HYDROGEN SULFIDE		BSWJ		ND[0.003]	M16	
HYDROGEN SULFIDE		BSWIA1		ND[0.017]	M16	
HYDROGEN SULFIDE		BSWIG1		ND[0.001]	M16	
HYDROGEN SULFIDE		BSWIG2		ND[0.002]	M16	
HYDROGEN SULFIDE		BSWIJ1	0.0098 to 0.0256	2.0E-02	M16	
HYDROGEN SULFIDE		BSWIJ2		ND[3.9E-03]	M16	
NO. OF TESTS	DETECTS		RANGE	MEDIAN*		
9	3		ND to 3.8E-02	9.8E-04		
VACUUM DRUM WASHERS						
ISOPROPANOL		BSWG1		ND[0.004]	M18	
ISOPROPANOL		BSWG2		ND[0.003]	M18	
ISOPROPANOL		BSWH		ND[0.019]	M18	
ISOPROPANOL		BSWJ		ND[0.003]	M18	
ISOPROPANOL		BSWIA1		ND[0.018]	HEATED CANISTER	FID
ISOPROPANOL		BSWID1		ND[0.045]	HEATED CANISTER	FID
ISOPROPANOL		BSWID2		ND[0.018]	HEATED CANISTER	FID

TABLE 5 SUMMARY OF 'AIR TOXIC' EMISSIONS FROM BROWNSTOCK WASHERS, CONTD.

VOLATILE ORGANIC COMPOUND		MILL CODE	EMISSIONS RANGE lb/ADTUBP	EMISSIONS AVG lb/ADTUBP	TEST METHOD	COMMENTS
ISOPROPANOL		BSWIE1		ND[0.052]	HEATED CANISTER	FID
ISOPROPANOL		BSWIE2		ND[0.028]	HEATED CANISTER	FID
ISOPROPANOL		BSWIH1		ND[0.030]	HEATED CANISTER	FID
ISOPROPANOL		BSWIH2		ND[0.036]	HEATED CANISTER	FID
ISOPROPANOL		BSWIJ1		ND[0.015]	HEATED CANISTER	FID
ISOPROPANOL		BSWIJ2		ND[0.013]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
13	0		ND	ND		
DIFFUSION, PRESSURE, BELT & COMPACTION BAFFLE WASHERS						
ISOPROPANOL		BSWIA2		ND[0.0024]	HEATED CANISTER	FID
VACUUM DRUM WASHERS						
METHANOL		BSWA1	-	2.3E+00	NMIT	NCASI IMPINGER METHOD
METHANOL		BSWA2	1.48 to 1.75	1.6E+00	NMIT	NCASI IMPINGER METHOD
METHANOL		BSWB	0.59 to 0.97	7.8E-01	NMIT	NCASI IMPINGER METHOD
METHANOL		BSWD	-	3.9E-01	MOD NIOSH 2000	
METHANOL		BSWE		3.0E-01	MOD NIOSH 2000	
METHANOL		BSWF	0.82 to 1.73	1.0E+00	MOD NIOSH 2000	
METHANOL		BSWG1	-	1.8E-01	M18	
METHANOL		BSWG2	-	1.4E-01	M18	
METHANOL		BSWH	0.21 to 0.34	2.8E-01	M18	
METHANOL		BSWI1	0.17 to 0.97	8.1E-01	M18	
METHANOL		BSWI2	0.087 to 0.305	2.7E-01	M18	
METHANOL		BSWJ	0.39 to 0.52	4.6E-01	M18	
METHANOL		BSWMA1		1.9E+00	HEATED CANISTER	FID
METHANOL		BSWMA2		1.0E+00	HEATED CANISTER	FID
METHANOL		BSWMH1		5.3E-01	HEATED CANISTER	FID
METHANOL		BSWMH2		4.6E-01	HEATED CANISTER	FID
METHANOL		BSWML1		6.3E-01	HEATED CANISTER	FID
METHANOL		BSWML2		1.5E-01	HEATED CANISTER	FID
METHANOL		BSWIA1	0.666 to 0.726	6.9E-01	HEATED CANISTER	FID
METHANOL		BSWID1	1.555 to 2.603	2.0E+00	HEATED CANISTER	FID
METHANOL		BSWID2	1.159 to 1.851	1.5E+00	HEATED CANISTER	FID
METHANOL		BSWIE1	2.618 to 6.139	4.2E+00	HEATED CANISTER	FID
METHANOL		BSWIE2	1.009 to 1.646	1.4E+00	HEATED CANISTER	FID
METHANOL		BSWIF	0.128 to 0.210	1.7E-01	HEATED CANISTER	FID, coeluted with ACETALDEHYDE
METHANOL		BSWIG1	0.323 to 0.396	3.6E-01	HEATED CANISTER	FID, coeluted with ACETALDEHYDE
METHANOL		BSWIG2	0.438 to 0.585	5.2E-01	HEATED CANISTER	FID, coeluted with ACETALDEHYDE
METHANOL		BSWIH1	0.968 to 1.049	1.0E+00	HEATED CANISTER	FID
METHANOL		BSWIH2	0.957 to 1.517	1.1E+00	HEATED CANISTER	FID
METHANOL		BSWIJ1	0.540 to 1.416	1.0E+00	HEATED CANISTER	FID
METHANOL		BSWIJ2	1.200 to 1.826	1.5E+00	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
30	30		8.7E-02 to 6.1	7.4E-01		
DIFFUSION, PRESSURE, BELT & COMPACTION BAFFLE WASHERS						
METHANOL		BSWMG1		1.5E-01	HEATED CANISTER	FID
METHANOL		BSWMG2		3.9E-02	HEATED CANISTER	FID
METHANOL		BSWMM		2.5E-01	HEATED CANISTER	FID
METHANOL		BSWMO1		7.5E-02	HEATED CANISTER	FID
METHANOL		BSWMO2		6.3E-02	HEATED CANISTER	FID
METHANOL		BSWMF		8.1E-04	HEATED CANISTER	FID
METHANOL		BSWIA2	0.066 to 0.105	8.1E-02	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
7	7		8.1E-04 to 2.5E-01	7.5E-02		
VACUUM DRUM WASHERS						
METHYL ETHYL KETONE		BSWA1	-	6.1E-02	NMIT	NCASI IMPINGER METHOD
METHYL ETHYL KETONE		BSWA2	0.032 to 0.037	3.4E-02	NMIT	NCASI IMPINGER METHOD
METHYL ETHYL KETONE		BSWB	0.009 to 0.018	1.3E-02	NMIT	NCASI IMPINGER METHOD
METHYL ETHYL KETONE		BSWG1	52 ppb	3.0E-04	VOST	
METHYL ETHYL KETONE		BSWG2	59 ppb	4.2E-04	VOST	
METHYL ETHYL KETONE		BSWH		ND[0.019]	M18	
METHYL ETHYL KETONE		BSWI1		ND[0.0065]	M18	
METHYL ETHYL KETONE		BSWI2		ND[0.0072]	M18	
METHYL ETHYL KETONE		BSWJ	6 ppb	6.1E-05	VOST	

TABLE 5 SUMMARY OF 'AIR TOXIC' EMISSIONS FROM BROWNSTOCK WASHERS, CONTD.

VOLATILE ORGANIC COMPOUND		MILL CODE	EMISSIONS RANGE lb/ADTUBP	AVG lb/ADTUBP	TEST METHOD	COMMENTS
METHYL ETHYL KETONE		BSWMA1		3.2E-03	HEATED CANISTER	FID
METHYL ETHYL KETONE		BSWMA2		8.2E-03	HEATED CANISTER	FID
METHYL ETHYL KETONE		BSWMH1		5.7E-04	HEATED CANISTER	FID
METHYL ETHYL KETONE		BSWMH2		4.5E-03	HEATED CANISTER	FID
METHYL ETHYL KETONE		BSWML1		9.0E-03	HEATED CANISTER	FID
METHYL ETHYL KETONE		BSWML2		6.7E-04	HEATED CANISTER	FID
METHYL ETHYL KETONE		BSWIA1		ND[0.0218]	HEATED CANISTER	FID
METHYL ETHYL KETONE		BSWID1	0.030 to 0.058	3.0E-02	HEATED CANISTER	FID, 5.4E-02 by DNPH
METHYL ETHYL KETONE		BSWID2		ND[8.0E-02]	HEATED CANISTER	FID, 1.4E-02 by DNPH
METHYL ETHYL KETONE		BSWIE1	0.035 to 0.067	3.6E-02	HEATED CANISTER	FID, 3.8E-03 by DNPH
METHYL ETHYL KETONE		BSWIE2	0.021 to 0.038	2.1E-02	HEATED CANISTER	FID, 9.6E-03 by DNPH
METHYL ETHYL KETONE		BSWIF	0.011 to 0.019	1.2E-02	HEATED CANISTER	FID, 1.8E-03 by DNPH
METHYL ETHYL KETONE		BSWIG1		ND[2.6E-02]	HEATED CANISTER	FID, 5.1E-04 by DNPH
METHYL ETHYL KETONE		BSWIG2		ND[3.1E-02]	HEATED CANISTER	FID, 6.7E-04 by DNPH
METHYL ETHYL KETONE		BSWIH1		ND[3.6E-02]	HEATED CANISTER	FID, 3.3E-02 by DNPH
METHYL ETHYL KETONE		BSWIH2	0.032 to 0.067	4.2E-02	HEATED CANISTER	FID, 1.6E-02 by DNPH
METHYL ETHYL KETONE		BSWIJ1	0.015 to 0.027	1.7E-02	HEATED CANISTER	FID, 1.9E-02 by DNPH
METHYL ETHYL KETONE		BSWIJ2	0.014 to 0.022	1.8E-02	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
27	19		ND to 6.7E-02	3.2E-03		
DIFFUSION, PRESSURE, BELT & COMPACTION BAFFLE WASHERS						
METHYL ETHYL KETONE		BSWMG1		6.5E-03	HEATED CANISTER	FID
METHYL ETHYL KETONE		BSWMG2		1.5E-03	HEATED CANISTER	FID
METHYL ETHYL KETONE		BSWMM		6.7E-03	HEATED CANISTER	FID
METHYL ETHYL KETONE		BSWMO1		1.0E-03	HEATED CANISTER	FID
METHYL ETHYL KETONE		BSWMO2		7.4E-04	HEATED CANISTER	FID
METHYL ETHYL KETONE		BSWMF		4.1E-06	HEATED CANISTER	FID
METHYL ETHYL KETONE		BSWIA2		ND[0.0029]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
7	6		ND to 6.7E-03	1.0E-03		
VACUUM DRUM WASHERS						
METHYL MERCAPTAN		BSWG1	-	7.7E-03	M16	
METHYL MERCAPTAN		BSWG2	-	1.8E-02	M16	
METHYL MERCAPTAN		BSWH	0.8 to 1.0 lb/hr	8.6E-02	M16	
METHYL MERCAPTAN		BSWJ	0.003 to 0.012	9.0E-03	M16	
METHYL MERCAPTAN		BSWMH1		ND[3.0E-04]	HEATED CANISTER	FID
METHYL MERCAPTAN		BSWMH2		ND[7.4E-03]	HEATED CANISTER	FID
METHYL MERCAPTAN		BSWML1		6.1E-03	HEATED CANISTER	FID
METHYL MERCAPTAN		BSWML2		1.4E-03	HEATED CANISTER	FID
METHYL MERCAPTAN		BSWIA1		ND[1.5E-02]	HEATED CANISTER	FID
METHYL MERCAPTAN		BSWID1	ND to 0.037	1.8E-02	HEATED CANISTER	FID
METHYL MERCAPTAN		BSWID2		ND[5.3E-02]	HEATED CANISTER	FID
METHYL MERCAPTAN		BSWIE1	0.022 to 0.043	2.2E-02	HEATED CANISTER	FID
METHYL MERCAPTAN		BSWIE2	0.012 to 0.024	1.3E-02	HEATED CANISTER	FID
METHYL MERCAPTAN		BSWIF		ND[8.8E-03]	HEATED CANISTER	FID
METHYL MERCAPTAN		BSWIG1		ND[1.7E-02]	HEATED CANISTER	FID
METHYL MERCAPTAN		BSWIG2		ND[2.0E-02]	HEATED CANISTER	FID
METHYL MERCAPTAN		BSWIH1	ND to 0.026	2.0E-02	HEATED CANISTER	FID
METHYL MERCAPTAN		BSWIH2	ND to 0.117	5.0E-02	HEATED CANISTER	FID
METHYL MERCAPTAN		BSWIJ1	0.026 to 0.070	4.2E-02	HEATED CANISTER	FID
METHYL MERCAPTAN		BSWIJ2	0.011 to 0.046	2.8E-02	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
20	13		ND to 1.2E-01	8.3E-03		
DIFFUSION, PRESSURE, BELT & COMPACTION BAFFLE WASHERS						
METHYL MERCAPTAN		BSWMG1		1.3E-03	HEATED CANISTER	FID
METHYL MERCAPTAN		BSWMG2		3.3E-04	HEATED CANISTER	FID
METHYL MERCAPTAN		BSWMM		1.6E-02	HEATED CANISTER	FID
METHYL MERCAPTAN		BSWMO1		ND[4.0E-04]	HEATED CANISTER	FID
METHYL MERCAPTAN		BSWMO2		ND[4.4E-04]	HEATED CANISTER	FID
METHYL MERCAPTAN		BSWMF		ND[2.8E-05]	HEATED CANISTER	FID
METHYL MERCAPTAN		BSWAI2		ND[1.9E-03]		
NO. OF TESTS	DETECTS		RANGE	MEDIAN*		
7	3		ND to 1.6E-02	8.0E-05		

TABLE 5 SUMMARY OF 'AIR TOXIC' EMISSIONS FROM BROWNSTOCK WASHERS, CONTD.

VOLATILE ORGANIC COMPOUND		MILL CODE	EMISSIONS RANGE lb/ADTUBP	EMISSIONS AVG lb/ADTUBP	TEST METHOD	COMMENTS
VACUUM DRUM WASHERS						
METHYLENE CHLORIDE		BSWG1	62 ppb	4.2E-04	VOST	
METHYLENE CHLORIDE		BSWG2	41 ppb	3.4E-04	VOST	
METHYLENE CHLORIDE		BSWJ	258 ppb	3.1E-03	VOST	
METHYLENE CHLORIDE		BSWMA1		ND[1.8E-04]	HEATED CANISTER	FID
METHYLENE CHLORIDE		BSWMA2		3.2E-04	HEATED CANISTER	FID
METHYLENE CHLORIDE		BSWMH1		ND[9.0E-04]	HEATED CANISTER	FID
METHYLENE CHLORIDE		BSWMH2		1.9E-03	HEATED CANISTER	FID, U
METHYLENE CHLORIDE		BSWML1		ND[5.0E-04]	HEATED CANISTER	FID
METHYLENE CHLORIDE		BSWML2		ND[4.2E-04]	HEATED CANISTER	FID
METHYLENE CHLORIDE		BSWIA1		ND[2.8E-02]	HEATED CANISTER	FID
METHYLENE CHLORIDE		BSWID1		ND[8.4E-02]	HEATED CANISTER	FID
METHYLENE CHLORIDE		BSWID2	ND to 0.102	5.4E-02	HEATED CANISTER	FID
METHYLENE CHLORIDE		BSWIE1		ND[7.4E-02]	HEATED CANISTER	FID
METHYLENE CHLORIDE		BSWIE2		ND[3.9E-02]	HEATED CANISTER	FID
METHYLENE CHLORIDE		BSWIF	ND to 0.036	1.8E-02	HEATED CANISTER	FID
METHYLENE CHLORIDE		BSWIG1		ND[3.0E-02]	HEATED CANISTER	FID
METHYLENE CHLORIDE		BSWIG2		ND[3.6E-02]	HEATED CANISTER	FID
METHYLENE CHLORIDE		BSWIH1		ND[4.2E-02]	HEATED CANISTER	FID
METHYLENE CHLORIDE		BSWIH2		ND[5.0E-02]	HEATED CANISTER	FID
METHYLENE CHLORIDE		BSWIJ1	0.042 to 0.092	6.2E-02	HEATED CANISTER	FID
METHYLENE CHLORIDE		BSWIJ2		ND[1.9E-02]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN*		
21	8		ND to 1.0E-01	6.4E-05		
DIFFUSION, PRESSURE, BELT & COMPACTION BAFFLE WASHERS						
METHYLENE CHLORIDE		BSWMG1		ND[9.1E-05]	HEATED CANISTER	FID
METHYLENE CHLORIDE		BSWMG2		ND[2.7E-05]	HEATED CANISTER	FID
METHYLENE CHLORIDE		BSWMM		ND[3.6E-04]	HEATED CANISTER	FID
METHYLENE CHLORIDE		BSWMO1		ND[1.2E-04]	HEATED CANISTER	FID
METHYLENE CHLORIDE		BSWMO2		ND[1.4E-04]	HEATED CANISTER	FID
METHYLENE CHLORIDE		BSWMF		ND[8.3E-06]	HEATED CANISTER	FID
METHYLENE CHLORIDE		BSWIA2		ND[3.4E-03]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
7	0		ND	ND		
VACUUM DRUM WASHERS						
METHYL ISOBUTYL KETONE		BSWI1		ND[0.0032]	M18	
METHYL ISOBUTYL KETONE		BSWI2	0.007 to 0.0145	1.1E-02	M18	
METHYL ISOBUTYL KETONE		BSWMA1		1.5E-04	HEATED CANISTER	FID
METHYL ISOBUTYL KETONE		BSWMA2		1.0E-03	HEATED CANISTER	FID
METHYL ISOBUTYL KETONE		BSWMH1		1.2E-05	HEATED CANISTER	FID
METHYL ISOBUTYL KETONE		BSWMH2		6.2E-04	HEATED CANISTER	FID
METHYL ISOBUTYL KETONE		BSWML1		5.5E-04	HEATED CANISTER	FID
METHYL ISOBUTYL KETONE		BSWML2		2.8E-04	HEATED CANISTER	FID
METHYL ISOBUTYL KETONE		BSWIA1		ND[3.0E-02]	HEATED CANISTER	FID
METHYL ISOBUTYL KETONE		BSWID1		ND[7.5E-02]	HEATED CANISTER	FID, ND[2.2E-03] by DNPH
METHYL ISOBUTYL KETONE		BSWID2		ND[1.1E-01]	HEATED CANISTER	FID, 2.0E-03 by DNPH
METHYL ISOBUTYL KETONE		BSWIE1		ND[8.7E-02]	HEATED CANISTER	FID, ND[1.8E-03] by DNPH
METHYL ISOBUTYL KETONE		BSWIE2		ND[4.6E-02]	HEATED CANISTER	FID, ND[9.7E-04] by DNPH
METHYL ISOBUTYL KETONE		BSWIF		ND[1.8E-02]	HEATED CANISTER	FID, 9.7E-04 by DNPH
METHYL ISOBUTYL KETONE		BSWIG1		ND[3.6E-02]	HEATED CANISTER	FID, ND[5.7E-04] by DNPH
METHYL ISOBUTYL KETONE		BSWIG2		ND[4.2E-02]	HEATED CANISTER	FID, 6.1E-04 by DNPH
METHYL ISOBUTYL KETONE		BSWIH1		ND[5.0E-02]	HEATED CANISTER	FID, ND[5.7E-04] by DNPH
METHYL ISOBUTYL KETONE		BSWIH2	ND to 0.034	2.8E-02	HEATED CANISTER	FID, ND[3.9E-04] by DNPH
METHYL ISOBUTYL KETONE		BSWIJ1		ND[2.5E-02]	HEATED CANISTER	FID, ND[2.6E-04] by DNPH
METHYL ISOBUTYL KETONE		BSWIJ2		ND[2.2E-02]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN*		
20	8		ND to 3.4E-02	1.2E-05		
DIFFUSION, PRESSURE, BELT & COMPACTION BAFFLE WASHERS						
METHYL ISOBUTYL KETONE		BSWMG1		6.5E-05	HEATED CANISTER	FID
METHYL ISOBUTYL KETONE		BSWMG2		3.6E-05	HEATED CANISTER	FID
METHYL ISOBUTYL KETONE		BSWMM		8.7E-03	HEATED CANISTER	FID
METHYL ISOBUTYL KETONE		BSWMO1		1.6E-04	HEATED CANISTER	FID
METHYL ISOBUTYL KETONE		BSWMO2		1.5E-04	HEATED CANISTER	FID

TABLE 5 SUMMARY OF 'AIR TOXIC' EMISSIONS FROM BROWNSTOCK WASHERS, CONTD.

VOLATILE ORGANIC COMPOUND		MILL CODE	EMISSIONS RANGE lb/ADTUBP	EMISSIONS AVG lb/ADTUBP	TEST METHOD	COMMENTS
METHYL ISOBUTYL KETONE		BSWMF		ND[1.0E-06]	HEATED CANISTER	FID
METHYL ISOBUTYL KETONE		BSWIA2		ND[4.0E-03]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
7	5		ND to 8.7E-03	6.5E-05		
VACUUM DRUM WASHERS						
NAPHTHALENE		BSWI1		ND[0.006]	M18	
NAPHTHALENE		BSWI2		ND[0.007]	M18	
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
2	0		ND	ND		
VACUUM DRUM WASHERS						
PHENOL		BSWE	-	2.7E-03	NA	
PHENOL		BSWIA1	ND to 0.227	1.5E-01	HEATED CANISTER	FID; suspicious data
PHENOL		BSWID1		ND[4.3E-02]	HEATED CANISTER	FID
PHENOL		BSWID2		ND[1.0E-01]	HEATED CANISTER	FID
PHENOL		BSWIE1		ND[8.2E-02]	HEATED CANISTER	FID
PHENOL		BSWIE2		ND[4.3E-02]	HEATED CANISTER	FID
PHENOL		BSWIF		ND[1.7E-02]	HEATED CANISTER	FID
PHENOL		BSWIG1		ND[3.3E-02]	HEATED CANISTER	FID
PHENOL		BSWIG2		ND[4.0E-02]	HEATED CANISTER	FID
PHENOL		BSWIH1	ND to 0.049	3.2E-02	HEATED CANISTER	FID
PHENOL		BSWIH2	ND to 0.065	3.6E-02	HEATED CANISTER	FID
PHENOL		BSWIJ1		ND[2.4E-02]	HEATED CANISTER	FID
PHENOL		BSWIJ2		ND[2.1E-02]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN*		
13	4		ND to 2.3E-01	7.9E-04		
DIFFUSION, PRESSURE, BELT & COMPACTION BAFFLE WASHERS						
PHENOL		BSWIA2		ND[3.8E-03]	HEATED CANISTER	FID
VACUUM DRUM WASHERS						
ALPHA-PINENE		BSWG1	-	1.5E-02	M18	
ALPHA-PINENE		BSWG2	-	2.1E-02	M18	
ALPHA-PINENE		BSWH	0.019 to 0.105	5.7E-02	M18	
ALPHA-PINENE		BSWI1	<0.006 to 0.01	8.1E-03	M18	
ALPHA-PINENE		BSWI2	<0.008 to 0.403	2.5E-01	M18	
ALPHA-PINENE		BSWJ	1.18 to 1.69	1.4E+00	M18	
ALPHA-PINENE		BSWMA1		5.8E-03	HEATED CANISTER	FID
ALPHA-PINENE		BSWMA2		2.0E+00	HEATED CANISTER	FID
ALPHA-PINENE		BSWIE1		ND[0.0366]	HEATED CANISTER	FID
ALPHA-PINENE		BSWIF		ND[0.0249]	HEATED CANISTER	FID
ALPHA-PINENE		BSWIG1		ND[0.0483]	HEATED CANISTER	FID
ALPHA-PINENE		BSWIG2		ND[0.0576]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
12	8		ND to 2.0	1.2E-02		
VACUUM DRUM WASHERS						
BETA-PINENE		BSWG1	199 ppb	2.2E-03	VOST	
BETA-PINENE		BSWG2	-	9.1E-03	M18	
BETA-PINENE		BSWH	ND to 0.057	3.8E-02	M18	
BETA-PINENE		BSWI1	ND to 0.006	3.2E-03	M18	
BETA-PINENE		BSWI2	ND to 0.223	1.4E-01	M18	
BETA-PINENE		BSWJ	0.56 to 0.75	6.2E-01	M18	
BETA-PINENE		BSWMA1		3.5E-03	HEATED CANISTER	FID
BETA-PINENE		BSWMA2		5.2E-01	HEATED CANISTER	FID
BETA-PINENE		BSWIE1		ND[0.0366]	HEATED CANISTER	FID
BETA-PINENE		BSWIF		ND[0.0249]	HEATED CANISTER	FID
BETA-PINENE		BSWIG1		ND[0.0483]	HEATED CANISTER	FID
BETA-PINENE		BSWIG2		ND[0.0576]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
12	8		ND to 0.75	3.4E-03		
VACUUM DRUM WASHERS						
PROPIONALDEHYDE		BSWID1	0.0040 to 0.0050	4.6E-03	RTI DRAFT	DNPH

TABLE 5 SUMMARY OF 'AIR TOXIC' EMISSIONS FROM BROWNSTOCK WASHERS, CONTD.

VOLATILE ORGANIC COMPOUND		MILL CODE	EMISSIONS RANGE lb/ADTUBP	EMISSIONS AVG lb/ADTUBP	TEST METHOD	COMMENTS
PROPIONALDEHYDE		BSWID2	0.0031 to 0.0036	3.3E-03	RTI DRAFT	DNPH
PROPIONALDEHYDE		BSWIE1		ND[1.8E-03]	RTI DRAFT	DNPH
PROPIONALDEHYDE		BSWIE2	ND to 0.0010	6.0E-04	RTI DRAFT	DNPH
PROPIONALDEHYDE		BSWIF	0.0007 to 0.0023	1.3E-03	RTI DRAFT	DNPH
PROPIONALDEHYDE		BSWIG1		ND[4.9E-04]	RTI DRAFT	DNPH
PROPIONALDEHYDE		BSWIG2	ND to 0.0012	5.8E-04	RTI DRAFT	DNPH
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
7	5		ND to 5.0E-03	6.0E-04		
VACUUM DRUM WASHERS						
STYRENE		BSWG1	4 ppb	3.3E-05	VOST	
STYRENE		BSWG2		ND[0 ppb]	VOST	
STYRENE		BSWH	1 ppb	1.5E-05	VOST	
STYRENE		BSWMA1		2.7E-04	HEATED CANISTER	FID
STYRENE		BSWMA2		1.8E-04	HEATED CANISTER	FID
STYRENE		BSWMH1		1.3E-03	HEATED CANISTER	FID
STYRENE		BSWMH2		6.9E-04	HEATED CANISTER	FID
STYRENE		BSWML1		3.0E-03	HEATED CANISTER	FID
STYRENE		BSWML2		1.7E-04	HEATED CANISTER	FID
					HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
9	8		ND to 3.0E-03	1.8E-04		
DIFFUSION, PRESSURE, BELT & COMPACTION BAFFLE WASHERS						
STYRENE		BSWMG1		3.1E-04	HEATED CANISTER	FID
STYRENE		BSWMG2		3.6E-04	HEATED CANISTER	FID
STYRENE		BSWMM		2.2E-03	HEATED CANISTER	FID
STYRENE		BSWMO1		1.3E-05	HEATED CANISTER	FID
STYRENE		BSWMO2		ND[1.9E-05]	HEATED CANISTER	FID
STYRENE		BSWMF		1.4E-06		
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
9	5		ND to 2.2E-03	1.8E-04		
VACUUM DRUM WASHERS						
ALPHA-TERPENIOL		BSWI1	ND to 0.01	9.7E-04	M18	
ALPHA-TERPENIOL		BSWI2		ND[8.0E-03]	M18	
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
2	1		ND to 0.01	4.9E-04		
VACUUM DRUM WASHERS						
TETRACHLOROETHYLENE		BSWMA1		5.5E-04	HEATED CANISTER	FID
TETRACHLOROETHYLENE		BSWMA2		1.4E-04	HEATED CANISTER	FID
TETRACHLOROETHYLENE		BSWMH1		4.8E-04	HEATED CANISTER	FID, U
TETRACHLOROETHYLENE		BSWMH2		7.7E-04	HEATED CANISTER	FID, U
TETRACHLOROETHYLENE		BSWML1		4.6E-04	HEATED CANISTER	FID, U
TETRACHLOROETHYLENE		BSWML2		3.0E-04	HEATED CANISTER	FID, U
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
6	6		1.4E-04 to 7.7E-04	4.7E-04		
DIFFUSION, PRESSURE, BELT & COMPACTION BAFFLE WASHERS						
TETRACHLOROETHYLENE		BSWMG1		ND[6.2E-05]	HEATED CANISTER	FID
TETRACHLOROETHYLENE		BSWMG2		ND[1.9E-05]	HEATED CANISTER	FID
TETRACHLOROETHYLENE		BSWMM		6.9E-03	HEATED CANISTER	FID, U
TETRACHLOROETHYLENE		BSWMO1		3.7E-03	HEATED CANISTER	FID, U
TETRACHLOROETHYLENE		BSWMO2		ND[9.0E-05]	HEATED CANISTER	FID
TETRACHLOROETHYLENE		BSWMF		ND[5.8E-06]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
6	2		ND to 6.9E-03	7.5E-04		
VACUUM DRUM WASHERS						
TOLUENE		BSWG1	13 ppb	9.5E-05	VOST	
TOLUENE		BSWG2	56 ppb	5.1E-04	VOST	
TOLUENE		BSWH		ND[0.019]	M18	
TOLUENE		BSWI1		ND[0.003]	M18	
TOLUENE		BSWI2		ND[0.004]	M18	

TABLE 5 SUMMARY OF 'AIR TOXIC' EMISSIONS FROM BROWNSTOCK WASHERS, CONTD.

VOLATILE ORGANIC COMPOUND		MILL CODE	EMISSIONS RANGE lb/ADTUBP	EMISSIONS AVG lb/ADTUBP	TEST METHOD	COMMENTS
TOLUENE		BSWJ	45 ppb	5.8E-04	VOST	
TOLUENE		BSWMA1		7.3E-05	HEATED CANISTER	FID
TOLUENE		BSWMA2		5.4E-03	HEATED CANISTER	FID
TOLUENE		BSWMH1		1.8E-03	HEATED CANISTER	FID
TOLUENE		BSWMH2		6.6E-04	HEATED CANISTER	FID
TOLUENE		BSWML1		4.0E-04	HEATED CANISTER	FID
TOLUENE		BSWML2		1.1E-04	HEATED CANISTER	FID
TOLUENE		BSWIA1		ND[0.0278]	HEATED CANISTER	FID
TOLUENE		BSWID1	ND to 0.1437	6.6E-02	HEATED CANISTER	FID
TOLUENE		BSWID2		ND[0.1020]	HEATED CANISTER	FID
TOLUENE		BSWIE1		ND[0.0799]	HEATED CANISTER	FID
TOLUENE		BSWIE2		ND[0.0424]	HEATED CANISTER	FID
TOLUENE		BSWIF		ND[0.0168]	HEATED CANISTER	FID
TOLUENE		BSWIG1		ND[0.0327]	HEATED CANISTER	FID
TOLUENE		BSWIG2		ND[0.0389]	HEATED CANISTER	FID
TOLUENE		BSWIH1		ND[0.0460]	HEATED CANISTER	FID
TOLUENE		BSWIH2		ND[0.0543]	HEATED CANISTER	FID
TOLUENE		BSWIJ1		ND[0.0233]	HEATED CANISTER	FID
TOLUENE		BSWIJ2		ND[0.0203]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN*		
24	10		ND to 1.4E-01	2.3E-05		
DIFFUSION, PRESSURE, BELT & COMPACTION BAFFLE WASHERS						
TOLUENE		BSWMG1		1.1E-04	HEATED CANISTER	FID
TOLUENE		BSWMG2		2.0E-04	HEATED CANISTER	FID
TOLUENE		BSWMM		1.3E-02	HEATED CANISTER	FID
TOLUENE		BSWMO1		1.5E-04	HEATED CANISTER	FID
TOLUENE		BSWMO2		2.6E-04	HEATED CANISTER	FID
TOLUENE		BSWMF		ND[8.2E-06]	HEATED CANISTER	FID
TOLUENE		BSWIA2		ND[3.7E-03]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
7	5		ND to 1.3E-02	1.5E-04		
VACUUM DRUM WASHERS						
1,1,1-TRICHLORDETHANE		BSWG1	2 ppb	2.1E-05	VOST	
1,1,1-TRICHLORDETHANE		BSWMH1		2.7E-04	HEATED CANISTER	FID, U
1,1,1-TRICHLORDETHANE		BSWMH2		ND[1.3E-03]	HEATED CANISTER	FID
1,1,1-TRICHLORDETHANE		BSWML1		2.6E-04	HEATED CANISTER	FID, U
1,1,1-TRICHLORDETHANE		BSWML2		ND[2.4E-04]	HEATED CANISTER	FID
1,1,1-TRICHLORDETHANE		BSWIA1		ND[4.0E-02]	HEATED CANISTER	FID
1,1,1-TRICHLORDETHANE		BSWID1		ND[1.0E-01]	HEATED CANISTER	FID
1,1,1-TRICHLORDETHANE		BSWID2		ND[1.5E-01]	HEATED CANISTER	FID
1,1,1-TRICHLORDETHANE		BSWIE1		ND[1.2E-01]	HEATED CANISTER	FID
1,1,1-TRICHLORDETHANE		BSWIE2		ND[6.2E-02]	HEATED CANISTER	FID
1,1,1-TRICHLORDETHANE		BSWIF		ND[2.4E-02]	HEATED CANISTER	FID
1,1,1-TRICHLORDETHANE		BSWIG1		ND[4.7E-02]	HEATED CANISTER	FID
1,1,1-TRICHLORDETHANE		BSWIG2		ND[5.6E-02]	HEATED CANISTER	FID
1,1,1-TRICHLORDETHANE		BSWIH1		ND[6.7E-02]	HEATED CANISTER	FID
1,1,1-TRICHLORDETHANE		BSWIH2		ND[7.9E-02]	HEATED CANISTER	FID
1,1,1-TRICHLORDETHANE		BSWIJ1		ND[3.4E-02]	HEATED CANISTER	FID
1,1,1-TRICHLORDETHANE		BSWIJ2		ND[2.9E-02]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN*		
17	3		ND to 2.7E-04	1.9E-06		
DIFFUSION, PRESSURE, BELT & COMPACTION BAFFLE WASHERS						
1,1,1-TRICHLORDETHANE		BSWMG1		ND[5.0E-05]	HEATED CANISTER	FID
1,1,1-TRICHLORDETHANE		BSWMG2		ND[1.5E-05]	HEATED CANISTER	FID
1,1,1-TRICHLORDETHANE		BSWMM		6.6E-04	HEATED CANISTER	FID, U
1,1,1-TRICHLORDETHANE		BSWMO1		ND[6.6E-05]	HEATED CANISTER	FID, U
1,1,1-TRICHLORDETHANE		BSWMO2		ND[7.4E-05]	HEATED CANISTER	FID
1,1,1-TRICHLORDETHANE		BSWMF		ND[4.6E-06]	HEATED CANISTER	FID
1,1,1-TRICHLORDETHANE		BSWIA2		ND[5.4E-03]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN**		
7	1		ND to 6.6E-04	2.2E-05		

TABLE 5 SUMMARY OF 'AIR TOXIC' EMISSIONS FROM BROWNSTOCK WASHERS, CONTD.

VOLATILE ORGANIC COMPOUND	MILL CODE	EMISSIONS RANGE lb/ADTUBP	EMISSIONS AVG lb/ADTUBP	TEST METHOD	COMMENTS
VACUUM DRUM WASHERS					
1,1,2-TRICHLOROETHANE	BSWMA1		6.3E-05	HEATED CANISTER	FID
1,1,2-TRICHLOROETHANE	BSWMA2		1.7E-04	HEATED CANISTER	FID
1,1,2-TRICHLOROETHANE	BSWMH1		2.7E-04	HEATED CANISTER	FID, U
1,1,2-TRICHLOROETHANE	BSWMH2		7.9E-04	HEATED CANISTER	FID, U
1,1,2-TRICHLOROETHANE	BSWML1		ND[2.8E-04]	HEATED CANISTER	FID
1,1,2-TRICHLOROETHANE	BSWML2		ND[2.4E-04]	HEATED CANISTER	FID
1,1,2-TRICHLOROETHANE	BSWIA1		ND[4.0E-02]	HEATED CANISTER	FID
1,1,2-TRICHLOROETHANE	BSWID1	ND to 0.196	9.2E-02	HEATED CANISTER	FID
1,1,2-TRICHLOROETHANE	BSWID2		ND[1.5E-01]	HEATED CANISTER	FID
1,1,2-TRICHLOROETHANE	BSWIE1		ND[1.2E-01]	HEATED CANISTER	FID
1,1,2-TRICHLOROETHANE	BSWIE2		ND[6.1E-02]	HEATED CANISTER	FID
1,1,2-TRICHLOROETHANE	BSWIF		ND[2.4E-02]	HEATED CANISTER	FID
1,1,2-TRICHLOROETHANE	BSWIG1		ND[4.7E-02]	HEATED CANISTER	FID
1,1,2-TRICHLOROETHANE	BSWIG2		ND[5.6E-02]	HEATED CANISTER	FID
1,1,2-TRICHLOROETHANE	BSWIH1		ND[6.7E-02]	HEATED CANISTER	FID
1,1,2-TRICHLOROETHANE	BSWIH2		ND[7.9E-02]	HEATED CANISTER	FID
1,1,2-TRICHLOROETHANE	BSWIJ1		ND[3.4E-02]	HEATED CANISTER	FID
1,1,2-TRICHLOROETHANE	BSWIJ2		ND[2.9E-02]	HEATED CANISTER	FID
NO. OF TESTS / DETECTS		RANGE	MEDIAN		
18 / 5		ND to 2.0E-01	7.4E-07		
DIFFUSION, PRESSURE, BELT & COMPACTION BAFFLE WASHERS					
1,1,2-TRICHLOROETHANE	BSWMG1		ND[5.0E-05]	HEATED CANISTER	FID
1,1,2-TRICHLOROETHANE	BSWMG2		ND[1.6E-05]	HEATED CANISTER	FID
1,1,2-TRICHLOROETHANE	BSWMM		ND[1.7E-04]	HEATED CANISTER	FID
1,1,2-TRICHLOROETHANE	BSWMO1		ND[6.5E-05]	HEATED CANISTER	FID
1,1,2-TRICHLOROETHANE	BSWMO2		ND[7.4E-05]	HEATED CANISTER	FID
1,1,2-TRICHLOROETHANE	BSWMF		ND[4.6E-06]	HEATED CANISTER	FID
1,1,2-TRICHLOROETHANE	BSWIA2		ND[5.4E-03]	HEATED CANISTER	FID
NO. OF TESTS / DETECTS		RANGE	MEDIAN		
7 / 0		ND	ND		
VACUUM DRUM WASHERS					
1,2,4-TRICHLOROBENZENE	BSWMA1		1.5E-04	HEATED CANISTER	FID
1,2,4-TRICHLOROBENZENE	BSWMA2		1.2E-04	HEATED CANISTER	FID
1,2,4-TRICHLOROBENZENE	BSWMH1		ND[2.4E-04]	HEATED CANISTER	FID
1,2,4-TRICHLOROBENZENE	BSWMH2		ND[5.5E-04]	HEATED CANISTER	FID
1,2,4-TRICHLOROBENZENE	BSWML1		7.5E-05	HEATED CANISTER	FID, U
1,2,4-TRICHLOROBENZENE	BSWML2		1.2E-04	HEATED CANISTER	FID
NO. OF TESTS / DETECTS		RANGE	MEDIAN		
6 / 4		ND to 1.5E-04	9.7E-05		
DIFFUSION, PRESSURE, BELT & COMPACTION BAFFLE WASHERS					
1,2,4-TRICHLOROBENZENE	BSWMG1		ND[2.2E-05]	HEATED CANISTER	FID
1,2,4-TRICHLOROBENZENE	BSWMG2		ND[7.0E-06]	HEATED CANISTER	FID
1,2,4-TRICHLOROBENZENE	BSWMM		1.0E-02	HEATED CANISTER	FID, U
1,2,4-TRICHLOROBENZENE	BSWMO1		ND[3.0E-05]	HEATED CANISTER	FID, U
1,2,4-TRICHLOROBENZENE	BSWMO2		ND[3.4E-05]	HEATED CANISTER	FID
1,2,4-TRICHLOROBENZENE	BSWMF		ND[2.0E-06]	HEATED CANISTER	FID
NO. OF TESTS / DETECTS		RANGE	MEDIAN		
6 / 1		ND to 1.0E-02	4.2E-04		
VACUUM DRUM WASHERS					
TRICHLOROETHYLENE	BSWMA1		3.4E-04	HEATED CANISTER	FID
TRICHLOROETHYLENE	BSWMA2		4.4E-04	HEATED CANISTER	FID
TRICHLOROETHYLENE	BSWMH1		3.5E-04	HEATED CANISTER	FID, U
TRICHLOROETHYLENE	BSWMH2		7.0E-04	HEATED CANISTER	FID, U
TRICHLOROETHYLENE	BSWML1		ND[2.8E-04]	HEATED CANISTER	FID
TRICHLOROETHYLENE	BSWML2		1.5E-04	HEATED CANISTER	FID, U
TRICHLOROETHYLENE	BSWIA1		ND[4.0E-02]	HEATED CANISTER	FID
TRICHLOROETHYLENE	BSWID1		ND[9.9E-02]	HEATED CANISTER	FID
TRICHLOROETHYLENE	BSWID2		ND[1.5E-01]	HEATED CANISTER	FID
TRICHLOROETHYLENE	BSWIE1		ND[1.1E-01]	HEATED CANISTER	FID
TRICHLOROETHYLENE	BSWIE2		ND[6.1E-02]	HEATED CANISTER	FID
TRICHLOROETHYLENE	BSWIF		ND[2.4E-02]	HEATED CANISTER	FID

TABLE 5 SUMMARY OF 'AIR TOXIC' EMISSIONS FROM BROWNSTOCK WASHERS, CONTD.

VOLATILE ORGANIC COMPOUND		MILL CODE	EMISSIONS RANGE lb/ADTUBP	EMISSIONS AVG lb/ADTUBP	TEST METHOD	COMMENTS
TRICHLOROETHYLENE		BSWIG1		ND[4.7E-02]	HEATED CANISTER	FID
TRICHLOROETHYLENE		BSWIG2		ND[5.6E-02]	HEATED CANISTER	FID
TRICHLOROETHYLENE		BSWIH1		ND[6.6E-02]	HEATED CANISTER	FID
TRICHLOROETHYLENE		BSWIH2		ND[7.7E-02]	HEATED CANISTER	FID
TRICHLOROETHYLENE		BSWIJ1		ND[3.3E-02]	HEATED CANISTER	FID
TRICHLOROETHYLENE		BSWIJ2		ND[2.9E-02]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN*		
18	5		ND to 7.0E-04	9.7E-05		
DIFFUSION, PRESSURE, BELT & COMPACTION BAFFLE WASHERS						
TRICHLOROETHYLENE		BSWMG1		ND[5.0E-05]	HEATED CANISTER	FID
TRICHLOROETHYLENE		BSWMG2		2.0E-05	HEATED CANISTER	FID, U
TRICHLOROETHYLENE		BSWMM		3.2E-03	HEATED CANISTER	FID, U
TRICHLOROETHYLENE		BSWMO1		ND[6.4E-05]	HEATED CANISTER	FID, U
TRICHLOROETHYLENE		BSWMO2		ND[7.4E-05]	HEATED CANISTER	FID
TRICHLOROETHYLENE		BSWMF		ND[4.6E-06]	HEATED CANISTER	FID
TRICHLOROETHYLENE		BSWIA2		ND[5.3E-03]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN**		
7	2		ND to 3.2E-03	3.1E-06		
VACUUM DRUM WASHERS						
VINYL CHLORIDE		BSWH	58 ppb	5.1E-04	VOST	
VACUUM DRUM WASHERS						
m,p-XYLENE		BSWG1	1 ppb	2.5E-05	VOST	
m,p-XYLENE		BSWG2		ND[0 ppb]	VOST	
m,p-XYLENE		BSWH		ND[0.019]	M18	
m,p-XYLENE		BSWI1		ND[0.003]	M18	
m,p-XYLENE		BSWI2		ND[0.004]	M18	
m,p-XYLENE		BSWJ		ND[0.006]	M18	
m,p-XYLENE		BSWMH1		4.7E-04	HEATED CANISTER	FID
m,p-XYLENE		BSWMH2		4.3E-04	HEATED CANISTER	FID
m,p-XYLENE		BSWML1		1.0E-04	HEATED CANISTER	FID
m,p-XYLENE		BSWML2		5.9E-05	HEATED CANISTER	FID
m,p-XYLENE		BSWIA1		ND[3.2E-02]	HEATED CANISTER	FID
m,p-XYLENE		BSWID1	ND to 0.153	7.2E-02	HEATED CANISTER	FID
m,p-XYLENE		BSWID2		ND[1.2E-01]	HEATED CANISTER	FID
m,p-XYLENE		BSWIE1		ND[9.2E-02]	HEATED CANISTER	FID
m,p-XYLENE		BSWIE2		ND[4.9E-02]	HEATED CANISTER	FID
m,p-XYLENE		BSWIF		ND[1.9E-02]	HEATED CANISTER	FID
m,p-XYLENE		BSWIG1		ND[3.8E-02]	HEATED CANISTER	FID
m,p-XYLENE		BSWIG2	ND to 0.049	2.6E-02	HEATED CANISTER	FID
m,p-XYLENE		BSWIH1		ND[5.3E-02]	HEATED CANISTER	FID
m,p-XYLENE		BSWIH2		ND[6.3E-02]	HEATED CANISTER	FID
m,p-XYLENE		BSWIJ1		ND[2.7E-02]	HEATED CANISTER	FID
m,p-XYLENE		BSWIJ2		ND[2.3E-02]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN*		
22	7		ND to 0.153	9.0E-07		
DIFFUSION, PRESSURE, BELT & COMPACTION BAFFLE WASHERS						
m,p-XYLENE		BSWMG1		6.9E-05	HEATED CANISTER	FID
m,p-XYLENE		BSWMG2		6.0E-05	HEATED CANISTER	FID
m,p-XYLENE		BSWMM		3.0E-03	HEATED CANISTER	FID
m,p-XYLENE		BSWMO1		1.4E-05	HEATED CANISTER	FID
m,p-XYLENE		BSWMO2		ND[2.0E-05]	HEATED CANISTER	FID
m,p-XYLENE		BSWMF		ND[1.3E-06]	HEATED CANISTER	FID
m,p-XYLENE		BSWIA2		ND[4.3E-03]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
7	4		ND to 3.0E-03	1.4E-05		
VACUUM DRUM WASHERS						
o-XYLENE		BSWG1		ND[0 ppb]	VOST	
o-XYLENE		BSWG2		ND[0.006]	M18	
o-XYLENE		BSWH		ND[0.019]	M18	
o-XYLENE		BSWI1		ND[0.003]	M18	
o-XYLENE		BSWI2		ND[0.004]	M18	

TABLE 5 SUMMARY OF 'AIR TOXIC' EMISSIONS FROM BROWNSTOCK WASHERS, CONTD.

VOLATILE ORGANIC COMPOUND		MILL CODE	EMISSIONS RANGE lb/ADTUBP	EMISSIONS AVG lb/ADTUBP	TEST METHOD	COMMENTS
o-XYLENE		BSWJ	ND to 0.072	1.2E-02	M18	
o-XYLENE		BSWMH1		5.4E-04	HEATED CANISTER	FID
o-XYLENE		BSWMH2		5.9E-04	HEATED CANISTER	FID
o-XYLENE		BSWML1		2.4E-04	HEATED CANISTER	FID
o-XYLENE		BSWML2		4.9E-05	HEATED CANISTER	FID
o-XYLENE		BSWIA1		ND[3.2E-02]	HEATED CANISTER	FID
o-XYLENE		BSWID1	ND to 0.162	7.8E-02	HEATED CANISTER	FID
o-XYLENE		BSWID2		ND[1.2E-01]	HEATED CANISTER	FID
o-XYLENE		BSWIE1		ND[9.2E-02]	HEATED CANISTER	FID
o-XYLENE		BSWIE2		ND[4.9E-02]	HEATED CANISTER	FID
o-XYLENE		BSWIF		ND[1.9E-02]	HEATED CANISTER	FID
o-XYLENE		BSWIG1		ND[3.8E-02]	HEATED CANISTER	FID
o-XYLENE		BSWIG2	ND to 0.046	2.5E-02	HEATED CANISTER	FID
o-XYLENE		BSWIH1		ND[5.3E-02]	HEATED CANISTER	FID
o-XYLENE		BSWIH2		ND[6.3E-02]	HEATED CANISTER	FID
o-XYLENE		BSWIJ1		ND[2.7E-02]	HEATED CANISTER	FID
o-XYLENE		BSWIJ2		ND[2.3E-02]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN*		
22	7		ND to 0.162	5.8E-06		
DIFFUSION, PRESSURE, BELT & COMPACTION BAFFLE WASHERS						
o-XYLENE		BSWMG1		ND[1.4E-06]	HEATED CANISTER	FID
o-XYLENE		BSWMG2		ND[4.0E-06]	HEATED CANISTER	FID
o-XYLENE		BSWMM		4.5E-04	HEATED CANISTER	FID
o-XYLENE		BSWMO1		ND[1.7E-05]	HEATED CANISTER	FID
o-XYLENE		BSWMO2		1.3E-03	HEATED CANISTER	FID
o-XYLENE		BSWMF		ND[1.3E-06]	HEATED CANISTER	FID
o-XYLENE		BSWIA2		ND[4.3E-03]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN*		
7	2		ND to 1.3E-03	6.9E-05		
VACUUM DRUM WASHERS						
XYLENES		BSWMA1		6.1E-05	HEATED CANISTER	FID
XYLENES		BSWMA2		8.5E-04	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
2	2		6.1E-05 to 8.5E-04	4.5E-04		
VACUUM DRUM WASHERS						
TERPENES		BSWMH1		6.0E+00	HEATED CANISTER	FID
TERPENES		BSWMH2	>4.5E+0	4.5E+00	HEATED CANISTER	FID
TERPENES		BSWML1	>1.1E-02	1.1E-02	HEATED CANISTER	FID
TERPENES		BSWML2		4.8E-03	HEATED CANISTER	FID
TERPENES		BSWIA1	0.14 to 1.97	1.3E+00	HEATED CANISTER	FID
TERPENES		BSWID1	2.06 to 3.18	2.5E+00	HEATED CANISTER	FID
TERPENES		BSWID2	2.66 to 5.52	4.2E+00	HEATED CANISTER	FID
TERPENES		BSWIE1	0.14 to 0.27	1.8E-01	HEATED CANISTER	FID
TERPENES		BSWIE2	0.06 to 0.12	8.2E-02	HEATED CANISTER	FID
TERPENES		BSWIF		ND[2.5E-02]	HEATED CANISTER	FID
TERPENES		BSWIH1	ND to 0.06	5.0E-02	HEATED CANISTER	FID
TERPENES		BSWIH2	0.11 to 0.47	1.9E-01	HEATED CANISTER	FID
TERPENES		BSWIJ1	0.06 to 0.13	8.7E-02	HEATED CANISTER	FID
TERPENES		BSWIJ2	0.75 to 1.83	1.3E+00	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
14	13		ND to 6.0E+00	1.9E-01		
DIFFUSION, PRESSURE, BELT & COMPACTION BAFFLE WASHERS						
TERPENES		BSWMG1		3.9E-02	HEATED CANISTER	FID
TERPENES		BSWMG2	>1.2E-03	1.2E-03	HEATED CANISTER	FID, S
TERPENES		BSWMM		4.4E-05	HEATED CANISTER	FID
TERPENES		BSWMO1		2.5E-01	HEATED CANISTER	FID
TERPENES		BSWMO2		3.0E-01	HEATED CANISTER	FID
TERPENES		BSWMF		4.4E-05	HEATED CANISTER	FID
TERPENES		BSWIA2	0.008 to 0.015	1.2E-02	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
7	7		4.4E-05 to 3.0E-01	1.2E-02		

TABLE 5 SUMMARY OF 'AIR TOXIC' EMISSIONS FROM BROWNSTOCK WASHERS, CONTD.

VOLATILE ORGANIC COMPOUND		MILL CODE	EMISSIONS RANGE lb/ADTUBP	EMISSIONS AVG lb/ADTUBP	TEST METHOD	COMMENTS
			lb C/ADTUP	lb C/ADTUP		
VACUUM DRUM WASHERS						
TOTAL HYDROCARBONS		BSWA1	0.11 to 0.17	1.4E-01	M25A	See NCASI Tech. Bull. No. 646 for details
TOTAL HYDROCARBONS		BSWA2	0.06 to 0.15	1.6E-01	M25A	See NCASI Tech. Bull. No. 646 for details
TOTAL HYDROCARBONS		BSWB1	0.002 to 0.061	4.0E-02	M25A	See NCASI Tech. Bull. No. 646 for details
TOTAL HYDROCARBONS		BSWB2	0.018 to 0.055	4.0E-02	M25A	See NCASI Tech. Bull. No. 646 for details
TOTAL HYDROCARBONS		BSWC	0.90 to 1.04	9.7E-01	M25A	See NCASI Tech. Bull. No. 646 for details
TOTAL HYDROCARBONS		BSWMA1		6.1E-01	M25A	
TOTAL HYDROCARBONS		BSWMH1		2.0E+00	M25A	
TOTAL HYDROCARBONS		BSWMH2		2.1E-01	M25A	
TOTAL HYDROCARBONS		BSWML1		5.2E-01	M25A	
TOTAL HYDROCARBONS		BSWML2		1.2E-01	M25A	
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
10	10		2.0E-03 to 2.0E+00	1.8E-01		See Note (f) Below
DIFFUSION, PRESSURE, BELT & COMPACTION BAFFLE WASHERS						
TOTAL HYDROCARBONS		BSWMG1		1.7E-01	M25A	
TOTAL HYDROCARBONS		BSWMG2		2.7E-01	M25A	
TOTAL HYDROCARBONS		BSWMM		5.1E+00	M25A	
TOTAL HYDROCARBONS		BSWMO1		1.3E-01	M25A	
TOTAL HYDROCARBONS		BSWMO2		2.0E-01	M25A	
TOTAL HYDROCARBONS		BSWMF		1.8E-04	M25A	
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
6	6		1.8E-04 to 5.1E+00	1.9E-01		See Note (f) Below

Notes

(a) U - unidentified and unconfirmed by GC/MS

(b) For BSW units with codes BSWMX (X = A to Q) the heated canister gases were concentrated before analysis on the FID;

(c) For BSW units with codes BSWIX (X = A to J) the heated canister gases were not concentrated before analysis on the FID;

(d) S = saturated (above detector quantitation range)

(e) For BSWs units with codes BSWMX (X = A to Q), all emissions were available in lb/ODTBS; these were divided by 1.1 to get lb/ADTUBP;

(f) The median THC emission values for vacuum drum washers and other washers (including diffusion, pressure, belt and compaction) are comparable which is unexpected. Based on the much lower vent gas flow rates of the diffusion-type washers, one would expect a significantly lower emission of THCs (just as for eg. methanol). If only the vacuum drum washers tested during the NCASI MACT Study (15) are considered (BSWMA1, BSWMH1, BSWMH2, BSWML1 and BSWL2) the median THC emissions from VDWs is 0.52 lb C/ADTUBP.

MEDIAN - empirical median; MEDIAN* - "NORPLOT" median; MEDIAN** - "SDin" median

TABLE 6 SUMMARY OF 'AIR TOXIC' EMISSIONS FROM UNCONTROLLED KRAFT NCG SOURCES

MILL CODE	TEST DATE	WOOD TYPE	NCG SOURCE DESCRIPTION	ADTUBP/ DAY	SOURCES FROM WHICH NCGs WERE COLLECTED	AFTER SCRUBBER YES/NO	REFERENCE
NCGA	1992	SW	NCG VENT AT LIME KILN	450	PULPING, EVAPORATOR & STRIPPER	YES, WHITE LIQUOR	3
NCGB	1992	SW	TOTAL NCG TO LIME KILN	600	PULPING, EVAPORATOR & STRIPPER	SEE BELOW	3
NCGB(a)	1992	SW	ALL NCGs - STRIPPER GASES	600	PULPING & EVAPORATOR	YES, WHITE LIQUOR	3
NCGC	1992	SW	TOTAL NCG TO LIME KILN	1570	PULPING & EVAPORATOR	NO	3
NCGD	1992	SW	NCG BYPASS SCRUBBER VENT	1100	PULPING & EVAPORATOR	NO	3
NCGMM	1994	SW	TOTAL NCG TO THERMAL OXIDIZER	1060	PULPING & EVAPORATOR	NO	14
Individual Sources at Mills							
NCGB1	1992	SW	BLOW HEAT RECOVERY VENT GASES	600	BLOW HEAT RECOVERY VENT ONLY	YES, WHITE LIQUOR	3
NCGC2	1992	SW	BLOW HEAT RECOVERY VENT	1570	BLOW HEAT RECOVERY VENT ONLY	NO	3
NCGID1	1993	SW	KAMYR BLOW TANK VENT	528	BLOW TANK VENT ONLY	NO	9
NCGID2	1993	HW	KAMYR BLOW TANK VENT	720	BLOW TANK VENT ONLY	NO	9
NCGIE1	1993	SW	DIGESTER OFF-GASES	440	DIGESTER OFF-GASES ONLY	NO	9
NCGIE2	1993	HW	DIGESTER OFF-GASES	440	DIGESTER OFF-GASES ONLY	NO	9
NCGIH1	1993	SW	BATCH DIGESTER	653	DIGESTER OFF-GASES ONLY	NO	9
NCGIH2	1993	HW	BATCH DIGESTER	590	DIGESTER OFF-GASES ONLY	NO	9
NCGIJ	1993	SW	BLOW TANK VENT	480	BLOW TANK VENT ONLY	NO	9
NCGB2	1992	SW	EVAPARATOR GASES	600	EVAPORATORS	YES, WHITE LIQUOR	3
NCGC1	1992	SW	MULTI-EFFECT EVAP. HOTWELL VENT	1570	MULTI-EFFECT EVAP. HOTWELL ONLY	NO	3
NCGIE	1993	MIXED	EVAPORATOR/ TURP. CONDENSER	854	EVAPORATOR/ TURP. CONDENSER	NO	9
NCGB3	1992	SW	STRIPPER VENT GASES	600	STRIPPER GASES ONLY	NO	3

Notes

(a) Stripper Gas NCG compositions were subtracted from total NCG composition.

(b) In the following tables, for less than 5 sources tested, if percent censory is less than or equal to 50% (i.e. more than half observations are non-detect), then only those ND observations are included in the median determination (at half the detection limit) whose detection limits are less than or equal to twice the largest average detected observation.

References

3. Texas Emissions Speciation Study - Emission Test Results, Roy F. Weston, January 1993.

9. NCASI Mill Files, 1993

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TABLE 6 SUMMARY OF 'AIR TOXIC' EMISSIONS FROM UNCONTROLLED KRAFT NCG SOURCES, CONTD.

SOURCE: ALL LVHC NCGs (PULPING, EVAPORATOR & STRIPPER)

VOLATILE ORGANIC COMPOUND		MILL CODE	EMISSIONS RANGE lb/ADTUBP	EMISSIONS AVG lb/ADTUBP	TEST METHOD	COMMENTS
ACETONE		NCGA	ND to 1.1E-02	5.3E-03	M18	
ACETONE		NCGB	4.0E-02 to 4.4E-01	2.2E-01	M18	
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
2	2		ND to 4.4E-01	1.1E-01		
ALPHA-PINENE		NCGA	4.8E-02 to 3.3E-01	1.8E-01	M18	
ALPHA-PINENE		NCGB	1.5E-01 to 1.7E-01	1.6E-01	M18	
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
2	2		4.8E-02 to 1.7E-01	1.7E-01		
BENZENE		NCGA	ND to 5.3E-03	5.3E-03	M18	
BETA-PINENE		NCGA	1.1E-02 to 9.6E-02	5.0E-02	M18	
BETA-PINENE		NCGB	9.6E-02 to 1.1E-01	9.9E-02	M18	
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
2	2		1.1E-02 to 1.1E-01	7.4E-02		
BROMODICHLOROMETHANE		NCGA		ND[5.3E-03]	M18	
CARBON DISULFIDE		NCGA		ND[5.3E-03]	M16	
CARENE-3		NCGA	ND[5.3E-03]		M18	
CARENE-3		NCGB	1.6E-03 to 2.0E-03	1.6E-03	M18	
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
2	1		ND to 2.0E-03	1.6E-03		
CHLOROFORM		NCGA		ND[5.3E-03]	M18	
CUMENE		NCGA	ND to 4.6E-03	3.0E-03	M18	
CUMENE		NCGB		1.2E-03	M18	
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
2	2		ND to 5.3E-03	2.1E-03		
p-CYMENE		NCGA	ND to 5.3E-03	5.7E-03	M18	
p-CYMENE		NCGB	1.2E-02 to 1.6E-02	1.2E-02	M18	
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
2	2		ND to 1.6E-02	9.0E-03		
DIMETHYL DISULFIDE		NCGA		ND[5.3E-03]	M16	
DIMETHYL SULFIDE		NCGA	1.2E+00 to 2.6E+00	1.6E+00	M16	
DIMETHYL SULFIDE		NCGB	1.7E-01 to 5.4E+00	3.3E+00	M16	
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
2	2		1.7E-01 to 5.4E+00	2.4E+00		
ETHANOL		NCGA	ND[5.3E-03]		M18	
ETHANOL		NCGB	4.0E-04 to 8.4E-04	4.0E-04	M18	
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
2	1		ND to 8.4E-04	4.0E-04		

TABLE 6 SUMMARY OF 'AIR TOXIC' EMISSIONS FROM UNCONTROLLED KRAFT NCG SOURCES, CONTD.

SOURCE: ALL LVHC NCGs (PULPING, EVAPORATOR & STRIPPER)

VOLATILE ORGANIC COMPOUND		MILL CODE	EMISSIONS RANGE lb/ADTUBP	EMISSIONS AVG lb/ADTUBP	TEST METHOD	COMMENTS
ETHYL BENZENE		NCGA	ND to 5.3E-03	5.3E-03	M18	
ETHYL BENZENE		NCGB	ND[4.0E-04]	2.0E-04	M18	
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
2	1		ND to 5.3E-03	2.8E-03		
HYDROGEN SULFIDE		NCGA	3.2E-01 to 6.8E-01	5.1E-01	M18	
HYDROGEN SULFIDE		NCGB	1.7E-01 to 2.9E-01	2.2E-01	M18	
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
2	2		1.7E-01 to 6.8E-01	3.6E-01		
ISOPROPANOL		NCGA	ND to 5.3E-03	5.3E-03	M18	
ISOPROPANOL		NCGB	4.0E-03 to 2.0E-02	1.7E-02	M18	
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
2	2		ND to 2.0E-02	1.1E-02		
METHANOL		NCGA	ND to 5.3E-03	5.3E-03	M18	
METHANOL		NCGB	2.3E+00 to 7.8E+00	5.7E+00	M18	
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
2	2		ND to 7.8E+00	2.8E+00		
METHYL ETHYL KETONE		NCGA	ND [5.3E-3]	2.7E-03	M18	
METHYL ETHYL KETONE		NCGB	3.2E-03 to 8.0E-03	4.0E-03	M18	
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
2	1		ND to 8.0E-03	1.4E-03		
METHYL MERCAPTAN		NCGA	2.8 to 3.3	2.9E+00	M16	
METHYL MERCAPTAN		NCGB	1.0 to 1.8	1.3E+00	M16	
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
2	2		1.0 to 3.3	2.1E+00		
TOLUENE		NCGA	ND to 5.3E-03	5.3E-03	M18	
TOLUENE		NCGB	ND[4.0E-04]	2.0E-04	M18	
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
2	1		ND to 5.3E-03	2.8E-03		
m,p-XYLENE		NCGA		ND [5.3E-03]	M18	
o-XYLENE		NCGA	ND to 2.1E-02	1.1E-02	M18	
o-XYLENE		NCGB	ND[4.0E-04]	2.0E-04	M18	
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
2	1		ND to 2.1E-02	5.6E-03		

MEDIAM - empirical median

TABLE 6 SUMMARY OF 'AIR TOXIC' EMISSIONS FROM UNCONTROLLED KRAFT NCG SOURCES, CONTD.

SOURCE: LVHC NCGs (PULPING & EVAPORATOR GASES ONLY)

VOLATILE ORGANIC COMPOUND		MILL CODE	EMISSIONS RANGE lb/ADTUBP	AVG lb/ADTUBP	TEST METHOD	COMMENTS
ACETALDEHYDE		NCGMM		ND[1.3E-05]	HEATED CANISTER	FID
ACETONE		NCGB'	2.4E-02 to 4.5E-02	3.3E-02	M18	
ACETONE		NCGC	ND to 1.5E-03	1.5E-03	M18	
ACETONE		NCGD	0.03 to 4.03	2.1E+00	M18	
ACETONE		NCGMM		7.9E-03	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
4	4		ND to 4.03	2.0E-02		
ACROLEIN		NCGMM		ND[1.1E-05]	HEATED CANISTER	FID
ALPHA-PINENE		NCGB'	0.137 to 0.145	1.4E-01	M18	
ALPHA-PINENE		NCGC	0.124 to 0.139	1.3E-01	M18	
ALPHA-PINENE		NCGD	ND[2.2E-03]	1.1E-03	M18	
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
3	2		ND to 0.145	1.3E-01		
BENZENE		NCGC		ND [1.5E-03]	M18	
BENZENE		NCGD		ND[2.2E-03]	M18	
BENZENE		NCGMM		ND[1.8E-05]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
3	0		ND	ND		
BETA-PINENE		NCGB'	0.076 to 0.091	8.3E-02	M18	
BETA-PINENE		NCGC	0.050 to 0.055	5.2E-02	M18	
BETA-PINENE		NCGD	ND[2.2E-03]	1.1E-03	M18	
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
3	2		ND to 0.091	5.2E-02		
BROMODICHLOROMETHANE		NCGC		ND [1.5E-03]	M18	
BROMODICHLOROMETHANE		NCGD		ND[2.2E-03]	M18	
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
2	0		ND	ND		
CARBON DISULFIDE		NCGB'		1.8E-04	M16	
CARBON DISULFIDE		NCGC	ND[1.5E-03]		M16	
CARBON DISULFIDE		NCGD	ND[1.1E-03]		M18	
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
3	1		ND to 1.8E-04	1.8E-04		
CARBON TETRACHLORIDE		NCGMM		ND[7.2E-05]	HEATED CANISTER	FID
CARENE-3		NCGB'		1.2E-03	M18	
CARENE-3		NCGC	ND[1.5E-03]	7.5E-04	M18	
CARENE-3		NCGD	ND[2.2E-03]	1.1E-03	M18	
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
3	1		ND to 1.2E-03	1.1E-03		
CHLOROBENZENE		NCGMM		5.2E-04	HEATED CANISTER	FID, U
CHLOROFORM		NCGC		ND [1.5E-03]	M18	
CHLOROFORM		NCGD		ND[2.2E-03]	M18	
CHLOROFORM		NCGMM		ND[6.7E-05]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
3	0		ND	ND		
CUMENE		NCGB'	0.021 to 0.022	8.4E-04	M18	
CUMENE		NCGC	ND to 1.5E-03	1.5E-03	M18	

TABLE 6 SUMMARY OF 'AIR TOXIC' EMISSIONS FROM UNCONTROLLED KRAFT NCG SOURCES, CONTD.

SOURCE: LVHC NCGs (PULPING & EVAPORATOR GASES ONLY)

VOLATILE ORGANIC COMPOUND		MILL CODE	EMISSIONS RANGE lb/ADTUBP	EMISSIONS AVG lb/ADTUBP	TEST METHOD	COMMENTS
CUMENE		NCGD	ND[2.2E-3]	1.1E-03	M18	
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
3	2		ND to 1.5E-03	1.1E-03		
p-CYMENE		NCGB'	0.0082 to 0.0085	8.4E-03	M18	
p-CYMENE		NCGC	ND [1.5E-3]	7.5E-04	M18	
p-CYMENE		NCGD	ND[2.2E-3]	1.1E-03	M18	
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
3	1		ND to 8.5E-03	1.1E-03		
1,2-DICHLOROETHANE		NCGMM		ND[2.7E-05]	HEATED CANISTER	FID, U
1,2-DICHLOROETHYLENE		NCGMM		ND[3.0E-05]	HEATED CANISTER	FID
DIMETHYL DISULFIDE		NCGD	0.08 to 0.12	1.0E-01	M16	
DIMETHYL DISULFIDE		NCGMM		1.0E+00	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
2	2		0.08 to 1.0	5.5E-01		
DIMETHYL SULFIDE		NCGB'	1.3 to 4.8	2.7E+00	M16	
DIMETHYL SULFIDE		NCGD	1.2 to 1.7	1.4E+00	M16	
DIMETHYL SULFIDE		NCGMM		1.6E+00	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
3	3		1.2 to 4.8	1.8E+00		
ETHANOL		NCGC	ND to 1.5E-03	1.5E-03	M18	
ETHANOL		NCGD	ND [2.2E-3]	1.1E-03	M18	
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
2	1		ND to 1.5E-03	1.3E-03		
ETHYL BENZENE		NCGC		ND [1.5E-3]	M18	
ETHYL BENZENE		NCGD		ND[2.2E-3]	M18	
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
2	0		ND	ND		
FORMALDEHYDE		NCGMM		5.4E-03	NMIT	NCASI IMPINGER METHOD
n-HEXANE		NCGMM		2.1E-03	HEATED CANISTER	FID
HYDROGEN SULFIDE		NCGB'	ND to 0.02	1.2E-02	M18	
HYDROGEN SULFIDE		NCGC	ND to 1.5E-03	1.5E-03	M18	
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
2	2		ND to 2.0E-02	6.8E-03		
ISOPROPANOL		NCGB'	4.0E-04 to 2.0E-02	1.4E-02	M18	
ISOPROPANOL		NCGC	ND to 1.5E-03	1.5E-03	M18	
ISOPROPANOL		NCGD	ND to 0.11	5.0E-02	M18	
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
3	3		ND to 0.11	1.4E-02		
METHANOL		NCGB'	0.115 to 0.52	2.6E-01	M18	
METHANOL		NCGC	6.1E-03 to 9.2E-03	7.6E-03	M18	
METHANOL		NCGD	ND [2.2E-3]	1.1E-03	M18	
METHANOL		NCGMM		1.1E-01	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
4	3		ND to 0.52	5.8E-02		
METHYLENE CHLORIDE		NCGMM		ND[4.8E-05]	HEATED CANISTER	FID

TABLE 6 SUMMARY OF 'AIR TOXIC' EMISSIONS FROM UNCONTROLLED KRAFT NCG SOURCES. CONTD.

SOURCE: LVHC NCGs (PULPING & EVAPORATOR GASES ONLY)

VOLATILE ORGANIC COMPOUND		MILL CODE	EMISSIONS RANGE lb/ADTUBP	EMISSIONS AVG lb/ADTUBP	TEST METHOD	COMMENTS
METHYL ETHYL KETONE		NCGB'	3.2E-03 to 8.0E-03	4.0E-03	M18	
METHYL ETHYL KETONE		NCGC	ND [1.5E-3]	7.5E-04	M18	
METHYL ETHYL KETONE		NCGD	ND[2.2E-03]	1.1E-03	M18	
METHYL ETHYL KETONE		NCGMM		4.3E-03	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
4	2		ND to 8.0E-03	2.6E-03		
METHYL ISOBUTYL KETONE		NCGMM		2.1E-03	HEATED CANISTER	FID
METHYL MERCAPTAN		NCGB'	0.18 to 0.74	4.1E-01	M16	
METHYL MERCAPTAN		NCGD	ND [2.2E-3]	1.1E-03	M16	
METHYL MERCAPTAN		NCGMM		1.5E+00	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
3	2		ND to 1.5	4.1E-01		
STYRENE		NCGMM		5.0E-03	HEATED CANISTER	FID
TERPENES		NCGMM		1.4E-01	HEATED CANISTER	FID
TETRACHLOROETHYLENE		NCGMM		ND[2.2E-04]	HEATED CANISTER	FID
TOLUENE		NCGB'	ND[4.0E-04]	2.0E-04	M18	
TOLUENE		NCGC	ND [1.5E-3]	7.5E-04	M18	
TOLUENE		NCGD	ND[2.2E-3]	1.1E-03	M18	
TOLUENE		NCGMM		9.1E-03	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
4	1		ND to 9.1E-03	9.3E-04		
1,2,4-TRICHLOROBENZENE		NCGMM		7.0E-03	HEATED CANISTER	FID
1,1,1-TRICHLOROETHANE		NCGMM		ND[2.6E-05]	HEATED CANISTER	FID
1,1,2-TRICHLOROETHANE		NCGMM		ND[2.6E-05]	HEATED CANISTER	FID
TRICHLOROETHYLENE		NCGMM		ND[3.1E-05]	HEATED CANISTER	FID
m,p-XYLENE		NCGC		ND [1.5E-03]	M18	
m,p-XYLENE		NCGD		ND[2.2E-03]	M18	
m,p-XYLENE		NCGMM		ND[2.9E-05]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
3	0		ND	ND		
o-XYLENE		NCGC		ND[1.5E-03]	M18	
o-XYLENE		NCGD		ND [2.2E-03]	M18	
o-XYLENE		NCGMM		ND[2.9E-05]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
3	0		ND	ND		

MEDIAN - empirical median

TABLE 6 SUMMARY OF 'AIR TOXIC' EMISSIONS FROM UNCONTROLLED KRAFT NCG SOURCES, CONTD.

SOURCE: PULPING AREA NCGs - BLOW HEAT RECOVERY VENT GASES

			EMISSIONS			
VOLATILE ORGANIC COMPOUND		MILL CODE	RANGE lb/ADTUBP	AVG lb/ADTUBP	TEST METHOD	COMMENTS
ACETALDEHYDE		NCGIH1	4.4E-04 to 6.0E-04	5.1E-04	HEATED CANISTER	FID
ACETALDEHYDE		NCGIH2	2.8E-04 to 1.1E-03	5.7E-04	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
2	2		2.8E-4 to 1.1E-3	5.4E-04		
ACETONE		NCGB1	0.005 to 0.022 lb/hr	5.2E-04	M18	
ACETONE		NCGC2	ND to 0.1 lb/hr	1.5E-03	M18	
ACETONE		NCGID1	2.9E-04 to 7.0E-04	4.3E-04	HEATED CANISTER	FID
ACETONE		NCGID2		2.8E-04	HEATED CANISTER	FID
ACETONE		NCGIE1		5.0E-02	HEATED CANISTER	FID
ACETONE		NCGIE2		8.2E-02	HEATED CANISTER	FID
ACETONE		NCGIH1	3.5E-04 to 6.9E-04	5.2E-04	HEATED CANISTER	FID
ACETONE		NCGIH2	2.0E-04 to 1.1E-03	5.2E-04	HEATED CANISTER	FID
ACETONE		NCGIJ	ND[2.0E-04]	1.0E-04	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
9	8		ND to 8.2E-02	5.2E-04		
ACETOPHENONE		NCGID1		ND[3.0E-04]	HEATED CANISTER	FID
ACETOPHENONE		NCGIE2		ND[3.3E-03]	HEATED CANISTER	FID
ACETOPHENONE		NCGIH1		ND[2.0E-04]	HEATED CANISTER	FID
ACETOPHENONE		NCGIH2		ND[1.0E-04]	HEATED CANISTER	FID
ACETOPHENONE		NCGIJ		ND[4.0E-04]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
5	0		ND	ND		
ACROLEIN		NCGID1	ND[1.0E-04]		HEATED CANISTER	FID
ACROLEIN		NCGID2	ND[1.0E-04]		HEATED CANISTER	FID
ACROLEIN		NCGIH1	ND[8.0E-05]		HEATED CANISTER	FID
ACROLEIN		NCGIH2	ND to 7.0E-05	4.0E-05	HEATED CANISTER	FID
ACROLEIN		NCGIJ	ND[2.0E-04]		HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
5	1		ND to 7.0E-05	4.0E-05		
ALPHA-PINENE		NCGB1	0.13 to 0.21 lb/hr	6.8E-03	M18	
ALPHA-PINENE		NCGC2	5.4 to 7.4 lb/hr	1.0E-01	M18	
ALPHA-PINENE		NCGIJ	9.0E-03 to 1.1E-02	1.0E-02	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
3	3		5.2E-3 to 1.1E-1	1.0E-02		
ALPHA-TERPINEOL		NCGIJ		ND[5.0E-04]	HEATED CANISTER	FID
BENZENE		NCGC2		ND [1.5E-03]	M18	
BENZENE		NCGID1		ND[2.0E-04]	HEATED CANISTER	FID
BENZENE		NCGID2		ND[2.0E-04]	HEATED CANISTER	FID
BENZENE		NCGIE1		ND[1.7E-03]	HEATED CANISTER	FID
BENZENE		NCGIE2		ND[2.1E-03]	HEATED CANISTER	FID
BENZENE		NCGIH1		ND[1.0E-04]	HEATED CANISTER	FID
BENZENE		NCGIH2		ND[6.0E-05]	HEATED CANISTER	FID
BENZENE		NCGIJ		ND[3.0E-04]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
8	0		ND	ND		
BETA-PINENE		NCGB1	0.07 lb/hr	2.8E-03	M18	
BETA-PINENE		NCGC2	2.4 to 3.1 lb/hr	4.1E-02	M18	
BETA-PINENE		NCGIJ	1.3E-03 to 1.5E-03	1.4E-03	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
3	3		1.3E-3 to 4.7E-2	2.8E-03		

TABLE 6 SUMMARY OF 'AIR TOXIC' EMISSIONS FROM UNCONTROLLED KRAFT NCG SOURCES, CONTD.

SOURCE: PULPING AREA NCGs - BLOW HEAT RECOVERY VENT GASES

			EMISSIONS			
VOLATILE ORGANIC COMPOUND		MILL CODE	RANGE lb/ADTUBP	AVG lb/ADTUBP	TEST METHOD	COMMENTS
BROMODICHLOROMETHANE		NCGC2		ND [1.5E-03]	M18	
CARBON DISULFIDE		NCGB1	-	1.8E-04	M16	
CARBON DISULFIDE		NCGC2	ND to 0.1 lb/hr	1.5E-03	M16	
CARBON DISULFIDE		NCGIJ		ND[6.0E-05]	M16	
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
3	2		ND to 1.5E-03	1.8E-04		
CARENE-3		NCGB1	0.001 to 0.002	4.0E-05	M18	
CARENE-3		NCGC2	ND [1.5E-3]		M18	
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
2	1		ND to 8.0E-05	4.0E-05		
CARBON TETRACHLORIDE		NCGID1	ND[4.0E-04]	2.0E-04	HEATED CANISTER	FID
CARBON TETRACHLORIDE		NCGID2	ND[3.0E-04]	1.5E-04	HEATED CANISTER	FID
CARBON TETRACHLORIDE		NCGIE1		2.5E-02	HEATED CANISTER	FID
CARBON TETRACHLORIDE		NCGIE2		1.1E-02	HEATED CANISTER	FID
CARBON TETRACHLORIDE		NCGIH1	ND[2.0E-04]	1.0E-04	HEATED CANISTER	FID
CARBON TETRACHLORIDE		NCGIH2	ND to 4.9E-04	2.4E-04	HEATED CANISTER	FID
CARBON TETRACHLORIDE		NCGIJ	ND[5.0E-04]	2.5E-04	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
7	3		ND to 2.5E-02	2.4E-04		
CARBONYL SULFIDE		NCGIJ		ND[5.0E-05]	M16	
CHLOROBENZENE		NCGID1		ND[3.0E-04]	HEATED CANISTER	FID
CHLOROBENZENE		NCGID2		ND[2.0E-04]	HEATED CANISTER	FID
CHLOROBENZENE		NCGIE1		ND[2.5E-03]	HEATED CANISTER	FID
CHLOROBENZENE		NCGIE2		ND[3.1E-03]	HEATED CANISTER	FID
CHLOROBENZENE		NCGIH1		ND[2.0E-04]	HEATED CANISTER	FID
CHLOROBENZENE		NCGIH2		ND[9.0E-05]	HEATED CANISTER	FID
CHLOROBENZENE		NCGIJ		ND[4.0E-04]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
7	0		ND	ND		
CHLOROFORM		NCGC2	ND [1.5E-3]	7.5E-04	M18	
CHLOROFORM		NCGID1	ND[6.0E-04]	3.0E-04	HEATED CANISTER	FID
CHLOROFORM		NCGID2	ND[5.0E-04]	2.5E-04	HEATED CANISTER	FID
CHLOROFORM		NCGIE1		2.4E-02	HEATED CANISTER	FID
CHLOROFORM		NCGIE2		2.0E-02	HEATED CANISTER	FID
CHLOROFORM		NCGIH1	ND[3.0E-04]	1.5E-04	HEATED CANISTER	FID
CHLOROFORM		NCGIH2	ND[2.0E-04]	1.0E-04	HEATED CANISTER	FID
CHLOROFORM		NCGIJ	ND[8.0E-04]	4.0E-04	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
8	2		ND to 2.4E-02	3.5E-04		
CRESOL-M		NCGIJ		ND[4.0E-04]	HEATED CANISTER	FID
CRESOL-O		NCGID1	ND[3.0E-04]	1.5E-04	HEATED CANISTER	FID
CRESOL-O		NCGID2	ND[2.0E-04]	1.0E-04	HEATED CANISTER	FID
CRESOL-O		NCGIE1	ND[2.4E-03]	1.2E-03	HEATED CANISTER	FID
CRESOL-O		NCGIE2	ND[2.9E-03]	0.00145	HEATED CANISTER	FID
CRESOL-O		NCGIH1	8.6E-04 to 2.0E-03	1.4E-03	HEATED CANISTER	FID
CRESOL-O		NCGIH2	ND to 3.5E-04	1.8E-04	HEATED CANISTER	FID

TABLE 6 SUMMARY OF 'AIR TOXIC' EMISSIONS FROM UNCONTROLLED KRAFT NCG SOURCES, CONTD.

SOURCE: PULPING AREA NCGs - BLOW HEAT RECOVERY VENT GASES

VOLATILE ORGANIC COMPOUND		MILL CODE	EMISSIONS RANGE lb/ADTUBP	EMISSIONS AVG lb/ADTUBP	TEST METHOD	COMMENTS
CRESOL-O		NCGU	ND[4.0E-04]	2.0E-04	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
7	2		ND to 2.0E-03	2.0E-04		
CUMENE		NCGB1	0.001 to 0.002 lb/hr	4.0E-05	M18	
CUMENE		NCGC2	ND [1.5E-03]		M18	
CUMENE		NCGID2	ND[2.0E-04]		HEATED CANISTER	FID
CUMENE		NCGIE1	ND[2.7E-03]		HEATED CANISTER	FID
CUMENE		NCGIE2	ND[3.3E-03]		HEATED CANISTER	FID
CUMENE		NCGIH1	ND[2.0E-04]		HEATED CANISTER	FID
CUMENE		NCGIH2	ND[1.0E-04]		HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
7	1		ND to 6.0E-05	4.0E-05		
p-CYMENE		NCGB1	0.008 to 0.013 lb/hr	3.8E-04	M18	
p-CYMENE		NCGC2	ND [1.5E-3]		M18	
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
2	1		ND to 5.0E-04	3.8E-04		
1,2 DICHLOROTHANE		NCGU		ND[3.0E-04]	HEATED CANISTER	FID
1,2 DICHLOROETHYLENE		NCGU		ND[3.0E-04]	HEATED CANISTER	FID
DIMETHYL DISULFIDE		NCGID1	7.9E-04 to 1.8E-03	1.3E-03	HEATED CANISTER	FID
DIMETHYL DISULFIDE		NCGID2	ND[2.0E-04]	1.0E-04	HEATED CANISTER	FID
DIMETHYL DISULFIDE		NCGIE1		4.4E-01	HEATED CANISTER	FID
DIMETHYL DISULFIDE		NCGIE2		5.5E-02	HEATED CANISTER	FID
DIMETHYL DISULFIDE		NCGIH1	4.1E-04 to 3.2E-03	2.1E-03	HEATED CANISTER	FID
DIMETHYL DISULFIDE		NCGIH2	4.5E-04 to 3.0E-03	1.4E-03	HEATED CANISTER	FID
DIMETHYL DISULFIDE		NCGU		2.6E-04	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
7	6		ND to 4.4E-01	1.4E-03		
DIMETHYL SULFIDE		NCGB1	1.8 to 21 lb/hr	3.8E-01	M16	
DIMETHYL SULFIDE		NCGID1	1.2E-02 to 2.7E-02	1.9E-02	HEATED CANISTER	FID
DIMETHYL SULFIDE		NCGID2		4.9E-03	HEATED CANISTER	FID
DIMETHYL SULFIDE		NCGIE1		1.5E+00	HEATED CANISTER	FID
DIMETHYL SULFIDE		NCGIE2		1.0E+00	HEATED CANISTER	FID
DIMETHYL SULFIDE		NCGIH1	8.1E-03 to 1.0E-02	9.4E-03	HEATED CANISTER	FID
DIMETHYL SULFIDE		NCGIH2	1.1E-02 to 1.8E-02	1.4E-02	HEATED CANISTER	FID
DIMETHYL SULFIDE		NCGU		2.2E-03	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
8	8		ND to 1.5E+00	1.7E-02		
ETHANOL		NCGC2	ND [1.5E-3]	7.5E-04	M18	
ETHANOL		NCGID1	ND to 1.9E-04	1.3E-04	HEATED CANISTER	FID
ETHANOL		NCGID2	ND[9.0E-05]	4.5E-05	HEATED CANISTER	FID
ETHANOL		NCGIE1		9.6E-03	HEATED CANISTER	FID
ETHANOL		NCGIE2		7.2E-03	HEATED CANISTER	FID
ETHANOL		NCGIH1	ND to 2.8E-04	1.7E-04	HEATED CANISTER	FID
ETHANOL		NCGIH2	7.0E-05 to 1.9E-04	1.1E-04	HEATED CANISTER	FID
ETHANOL		NCGU	ND[2.0E-04]	1.0E-04	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
8	5		ND to 9.6E-03	1.5E-04		
ETHYL BENZENE		NCGC2		ND [1.5E-3]	M18	

TABLE 6 SUMMARY OF 'AIR TOXIC' EMISSIONS FROM UNCONTROLLED KRAFT NCG SOURCES, CONTD.

SOURCE: PULPING AREA NCGs - BLOW HEAT RECOVERY VENT GASES

VOLATILE ORGANIC COMPOUND		MILL CODE	EMISSIONS RANGE lb/ADTUBP	EMISSIONS AVG lb/ADTUBP	TEST METHOD	COMMENTS
ETHYL BENZENE		NCGID1		ND[4.0E-04]	HEATED CANISTER	FID
ETHYL BENZENE		NCGID2		ND[2.0E-04]	HEATED CANISTER	FID
ETHYL BENZENE		NCGIE1		ND[2.4E-03]	HEATED CANISTER	FID
ETHYL BENZENE		NCGIE2		ND[2.9E-03]	HEATED CANISTER	FID
ETHYL BENZENE		NCGIH1		ND[2.0E-04]	HEATED CANISTER	FID
ETHYL BENZENE		NCGIH2		ND[9.0E-05]	HEATED CANISTER	FID
ETHYL BENZENE		NCGIJ		ND[3.0E-04]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
8	0		ND	ND		
HEXACHLOROCYCLOPENTADIENE		NCGIJ		ND[9.0E-04]	HEATED CANISTER	FID
HEXACHLOROETHANE		NCGIJ		ND[8.0E-04]	HEATED CANISTER	FID
HEXANE-N		NCGID1		ND[2.0E-04]	HEATED CANISTER	FID
HEXANE-N		NCGID2		ND[2.0E-04]	HEATED CANISTER	FID
HEXANE-N		NCGIE1		ND[1.9E-03]	HEATED CANISTER	FID
HEXANE-N		NCGIE2		ND[2.3E-03]	HEATED CANISTER	FID
HEXANE-N		NCGIH1		ND[1.0E-04]	HEATED CANISTER	FID
HEXANE-N		NCGIH2		ND[7.0E-05]	HEATED CANISTER	FID
HEXANE-N		NCGIJ		ND[3.0E-04]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
7	0		ND	ND		
HYDROGEN SULFIDE		NCGC2	ND to 0.1 lb/hr	1.5E-03	M16	
HYDROGEN SULFIDE		NCGIJ	ND[3.0E-05]	1.5E-05	M16	
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
2	1		ND to 2.0E-03	7.7E-04		
ISOPROPANOL		NCGB1	0.001 to 0.105 lb/hr	1.7E-03	M18	
ISOPROPANOL		NCGC2	ND to 0.1 lb/hr	1.5E-03	M18	
ISOPROPANOL		NCGID1	ND[1.0E-04]	5.0E-05	HEATED CANISTER	FID
ISOPROPANOL		NCGID2	ND[1.0E-04]	5.0E-05	HEATED CANISTER	FID
ISOPROPANOL		NCGIE1	ND[1.3E-03]	6.5E-04	HEATED CANISTER	FID
ISOPROPANOL		NCGIE2	ND[1.6E-03]	8.0E-04	HEATED CANISTER	FID
ISOPROPANOL		NCGIH1	ND[9.0E-05]	4.5E-05	HEATED CANISTER	FID
ISOPROPANOL		NCGIH2	ND[5.0E-05]	2.5E-05	HEATED CANISTER	FID
ISOPROPANOL		NCGIJ	ND[2.0E-04]	1.0E-04	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
9	2		ND to 2.0E-03	1.0E-04		
METHANOL		NCGB1	0.003 to 0.10	1.6E-03	M18	
METHANOL		NCGC2	0.3 to 0.5 lb/hr	6.1E-03	M18	
METHANOL		NCGID1	6.8E-03 to 1.3E-02	9.6E-03	HEATED CANISTER	FID
METHANOL		NCGID2		2.9E-03	HEATED CANISTER	FID
METHANOL		NCGIE1		3.0E-01	HEATED CANISTER	FID
METHANOL		NCGIE2		1.2E+00	HEATED CANISTER	FID
METHANOL		NCGIH1	4.4E-03 to 1.0E-02	7.8E-03	HEATED CANISTER	FID
METHANOL		NCGIH2	5.3E-03 to 8.6E-03	6.4E-03	HEATED CANISTER	FID
METHANOL		NCGIJ	3.4E-04 to 4.4E-04	3.9E-04	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
9	9		3.4E-4 to 1.2E+00	6.4E-03		
METHYLENE CHLORIDE		NCGID1		ND[2.0E-04]	HEATED CANISTER	FID
METHYLENE CHLORIDE		NCGID2		ND[2.0E-04]	HEATED CANISTER	FID
METHYLENE CHLORIDE		NCGIE1		ND[1.9E-03]	HEATED CANISTER	FID

TABLE 6 SUMMARY OF 'AIR TOXIC' EMISSIONS FROM UNCONTROLLED KRAFT NCG SOURCES, CONTD.

SOURCE: PULPING AREA NCGs - BLOW HEAT RECOVERY VENT GASES

VOLATILE ORGANIC COMPOUND		MILL CODE	EMISSIONS RANGE lb/ADTUBP	EMISSIONS AVG lb/ADTUBP	TEST METHOD	COMMENTS
METHYLENE CHLORIDE		NCGIE2		ND[2.3E-03]	HEATED CANISTER	FID
METHYLENE CHLORIDE		NCGIH1		ND[1.0E-04]	HEATED CANISTER	FID
METHYLENE CHLORIDE		NCGIH2		ND[7.0E-05]	HEATED CANISTER	FID
METHYLENE CHLORIDE		NCGIJ		ND[3.0E-04]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
7	0		ND	ND		
METHYL ETHYL KETONE		NCGIB1	ND to 0.002 lb/hr	4.0E-05	M18	
METHYL ETHYL KETONE		NCGIC2	ND [1.5E-3]	7.5E-04	M18	
METHYL ETHYL KETONE		NCGID1	ND to 2.2E-04	1.3E-04	HEATED CANISTER	FID
METHYL ETHYL KETONE		NCGID2	ND[1.0E-04]	5.0E-05	HEATED CANISTER	FID
METHYL ETHYL KETONE		NCGIE1		1.9E-02	HEATED CANISTER	FID
METHYL ETHYL KETONE		NCGIE2		1.8E-02	HEATED CANISTER	FID
METHYL ETHYL KETONE		NCGIH1	1.4E-04 to 1.8E-04	1.5E-04	HEATED CANISTER	FID
METHYL ETHYL KETONE		NCGIH2	1.4E-04 to 2.0E-04	1.7E-04	HEATED CANISTER	FID
METHYL ETHYL KETONE		NCGIJ	ND[2.0E-04]	1.0E-04	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
9	6		ND to 1.9E-02	1.5E-04		
METHYL ISOBUTYL KETONE		NCGID1		ND[2.0E-04]	HEATED CANISTER	FID
METHYL ISOBUTYL KETONE		NCGID2		ND[2.0E-04]	HEATED CANISTER	FID
METHYL ISOBUTYL KETONE		NCGIE1		ND[2.2E-03]	HEATED CANISTER	FID
METHYL ISOBUTYL KETONE		NCGIE2		ND[2.7E-03]	HEATED CANISTER	FID
METHYL ISOBUTYL KETONE		NCGIH1		ND[1.0E-04]	HEATED CANISTER	FID
METHYL ISOBUTYL KETONE		NCGIH2		ND[8.0E-05]	HEATED CANISTER	FID
METHYL ISOBUTYL KETONE		NCGIJ		ND[3.0E-04]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
7	0		ND	ND		
METHYL MERCAPTAN		NCGID1	ND[1.0E-04]	5.0E-05	HEATED CANISTER	FID
METHYL MERCAPTAN		NCGID2	ND[9.0E-05]	4.5E-05	HEATED CANISTER	FID
METHYL MERCAPTAN		NCGIE1		5.7E-01	HEATED CANISTER	FID
METHYL MERCAPTAN		NCGIE2		3.9E-01	HEATED CANISTER	FID
METHYL MERCAPTAN		NCGIH1	ND to 3.7E-03	1.3E-03	HEATED CANISTER	FID
METHYL MERCAPTAN		NCGIH2	ND to 2.5E-03	1.0E-03	HEATED CANISTER	FID
METHYL MERCAPTAN		NCGIJ	ND[2.0E-04]	1.0E-04	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
7	4		ND to 5.7E-01	1.0E-03		
PHENOL		NCGID1	ND[2.0E-04]	1.0E-04	HEATED CANISTER	FID
PHENOL		NCGID2	ND[2.0E-04]	1.0E-04	HEATED CANISTER	FID
PHENOL		NCGIE1		1.0E-02	HEATED CANISTER	FID
PHENOL		NCGIE2	ND[2.6E-03]	1.3E-03	HEATED CANISTER	FID
PHENOL		NCGIH1	ND to 6.8E-03	2.3E-03	HEATED CANISTER	FID
PHENOL		NCGIH2	6.5E-04 to 7.8E-04	7.2E-04	HEATED CANISTER	FID
PHENOL		NCGIJ	ND[3.0E-04]	1.5E-04	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
7	2		ND to 1.0E-02	7.2E-04		
TERPENES		NCGID1	0.017 to 0.041	2.9E-02	HEATED CANISTER	FID
TERPENES		NCGID2		5.0E-03	HEATED CANISTER	FID
TERPENES		NCGIE1		1.8E-01	HEATED CANISTER	FID
TERPENES		NCGIE2		1.9E-02	HEATED CANISTER	FID
TERPENES		NCGIH1	0.009 to 0.030	1.7E-02	HEATED CANISTER	FID
TERPENES		NCGIH2	0.001 to 0.002	1.7E-03	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
7	7		0.001 to 0.180	1.8E-02		

TABLE 6 SUMMARY OF 'AIR TOXIC' EMISSIONS FROM UNCONTROLLED KRAFT NCG SOURCES, CONTD.

SOURCE: PULPING AREA NCGs - BLOW HEAT RECOVERY VENT GASES

VOLATILE ORGANIC COMPOUND		MILL CODE	EMISSIONS RANGE lb/ADTUBP	EMISSIONS AVG lb/ADTUBP	TEST METHOD	COMMENTS
TOLUENE		NCGB1	ND[4.0E-03]		M18	
TOLUENE		NCGC2	ND [1.5E-03]		M18	
TOLUENE		NCGID1	ND[2.0E-04]		HEATED CANISTER	FID
TOLUENE		NCGID2	ND[2.0E-04]		HEATED CANISTER	FID
TOLUENE		NCGIE1	ND[2.0E-03]		HEATED CANISTER	FID
TOLUENE		NCGIE2	ND[3.0E-03]		HEATED CANISTER	FID
TOLUENE		NCGIH1	ND[1.0E-04]	5.0E-05	HEATED CANISTER	FID
TOLUENE		NCGIH2	ND to 7.0E-05	5.0E-05	HEATED CANISTER	FID
TOLUENE		NCGIJ	ND[3.0E-04]		HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
9	1		ND to 7.0E-05	5.0E-05		
1,2,4 TRICHLOROBENZENE		NCGIJ		ND[6.0E-04]	HEATED CANISTER	FID
1,1,1 TRICHLOROETHANE		NCGID1		ND[3.0E-04]	HEATED CANISTER	FID
1,1,1 TRICHLOROETHANE		NCGID2		ND[3.0E-04]	HEATED CANISTER	FID
1,1,1 TRICHLOROETHANE		NCGIE1		ND[3.0E-03]	HEATED CANISTER	FID
1,1,1 TRICHLOROETHANE		NCGIE2		ND[3.6E-03]	HEATED CANISTER	FID
1,1,1 TRICHLOROETHANE		NCGIH1		ND[2.0E-04]	HEATED CANISTER	FID
1,1,1 TRICHLOROETHANE		NCGIH2		ND[1.0E-04]	HEATED CANISTER	FID
1,1,1 TRICHLOROETHANE		NCGIJ		ND[9.0E-04]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
7	0		ND	ND		
1,1,2 TRICHLOROETHANE		NCGID1		ND[3.0E-04]	HEATED CANISTER	FID
1,1,2 TRICHLOROETHANE		NCGID2		ND[3.0E-04]	HEATED CANISTER	FID
1,1,2 TRICHLOROETHANE		NCGIE1		ND[3.0E-03]	HEATED CANISTER	FID
1,1,2 TRICHLOROETHANE		NCGIE2		ND[3.6E-03]	HEATED CANISTER	FID
1,1,2 TRICHLOROETHANE		NCGIH1		ND[2.0E-04]	HEATED CANISTER	FID
1,1,2 TRICHLOROETHANE		NCGIH2		ND[1.0E-04]	HEATED CANISTER	FID
1,1,2 TRICHLOROETHANE		NCGIJ		ND[4.0E-04]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
7	0		ND	ND		
TRICHLOROETHYLENE		NCGID1		ND[3.0E-04]	HEATED CANISTER	FID
TRICHLOROETHYLENE		NCGID2		ND[3.0E-04]	HEATED CANISTER	FID
TRICHLOROETHYLENE		NCGIE1		ND[2.9E-03]	HEATED CANISTER	FID
TRICHLOROETHYLENE		NCGIE2		ND[3.6E-03]	HEATED CANISTER	FID
TRICHLOROETHYLENE		NCGIH1		ND[2.0E-04]	HEATED CANISTER	FID
TRICHLOROETHYLENE		NCGIH2		ND[1.0E-04]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
6	0		ND	ND		
m,p-XYLENE		NCGC2		ND [1.5E-03]	M18	
m,p-XYLENE		NCGID1		ND[3.0E-04]	HEATED CANISTER	FID
m,p-XYLENE		NCGID2		ND[2.0E-04]	HEATED CANISTER	FID
m,p-XYLENE		NCGIE1		ND[2.4E-03]	HEATED CANISTER	FID
m,p-XYLENE		NCGIE2		ND[2.9E-03]	HEATED CANISTER	FID
m,p-XYLENE		NCGIH1		ND[2.0E-04]	HEATED CANISTER	FID
m,p-XYLENE		NCGIH2		ND[9.0E-05]	HEATED CANISTER	FID
m,p-XYLENE		NCGIJ		ND[3.0E-04]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
8	0		ND	ND		
o-XYLENE		NCGC2		ND [1.5E-03]	M18	
o-XYLENE		NCGID1		ND[3.0E-04]	HEATED CANISTER	FID

TABLE 6 SUMMARY OF 'AIR TOXIC' EMISSIONS FROM UNCONTROLLED KRAFT NCG SOURCES, CONTD.

SOURCE: PULPING AREA NCGs - BLOW HEAT RECOVERY VENT GASES

VOLATILE ORGANIC COMPOUND		MILL CODE	EMISSIONS RANGE lb/ADTUBP	EMISSIONS AVG lb/ADTUBP	TEST METHOD	COMMENTS
o-XYLENE		NCGB2		ND(2.0E-04)	HEATED CANISTER	FID
o-XYLENE		NCGE1		ND(2.4E-05)	HEATED CANISTER	FID
o-XYLENE		NCGE2		ND(2.9E-05)	HEATED CANISTER	FID
o-XYLENE		NCGH1		ND(2.0E-04)	HEATED CANISTER	FID
o-XYLENE		NCGH2		ND(9.0E-05)	HEATED CANISTER	FID
o-XYLENE		NCGU		ND(3.0E-04)	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
8	0		ND	ND		

MEDIAN - empirical median

TABLE 6 SUMMARY OF 'AIR TOXIC' EMISSIONS FROM UNCONTROLLED KRAFT NCG SOURCES, CONTD.

SOURCE: EVAPORATOR NCGs ONLY

VOLATILE ORGANIC COMPOUND		MILL CODE	EMISSIONS RANGE lb/ADTUBP	EMISSIONS AVG lb/ADTUBP	TEST METHOD	COMMENTS
ACETONE		NCGB2	0.6 to 1.1 lb/hr	3.2E-02	M18	
ACETONE		NCGC1	ND to 0.1 lb/hr	1.5E-03	M18	
ACETONE		NCGIE	4.8E-4 to 8.0E-4	6.5E-04	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
3	3		ND to 4.4E-02	1.5E-03		
ACETOPHENONE		NCGIE		ND[7.0E-04]	HEATED CANISTER	FID
ALPHA-PINENE		NCGB2	3.3 to 3.6 lb/hr	1.4E-01	M18	
ALPHA-PINENE		NCGC1	ND to 1.5 lb/hr	9.2E-03	M18	
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
2	2		ND to 1.4E-01	7.3E-02		
BENZENE		NCGC1		ND [1.5E-3]	M18	
BENZENE		NCGIE		ND[5.0E-4]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
2	0		ND	ND		
BETA-PINENE		NCGB2	1.9 to 2.2 lb/hr	8.0E-02	M18	
BETA-PINENE		NCGC1	ND to 0.6 lb/hr	4.6E-03	M18	
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
2	2		ND to 8.8E-02	4.2E-02		
BROMODICHLOROMETHANE		NCGC1		ND [1.5E-3]	M18	
CARBON DISULFIDE		NCGC1		ND [1.5E-3]	M16	
CARBON TETRACHLORIDE		NCGIE		ND[9.0E-04]	HEATED CANISTER	FID
CARENE-3		NCGB2	0.03 lb/hr	1.2E-03	M18	
CARENE-3		NCGC1	ND to 0.1 lb/hr	1.5E-03	M18	
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
2	2		ND to 1.5E-03	1.4E-03		
CHLOROBENZENE		NCGIE		ND[7.0E-04]	HEATED CANISTER	FID
CHLOROFORM		NCGC1	ND to 0.3 lb/hr	1.5E-03	M18	
CHLOROFORM		NCGIE	ND[1.5E-03]	7.5E-04	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
2	1		ND to 1.5E-03	1.1E-03		
CRESOL-O		NCGIE		ND[7.0E-04]	HEATED CANISTER	FID
CUMENE		NCGB2	0.02 lb/hr	8.0E-04	M18	
CUMENE		NCGC1	ND to 0.1 lb/hr	1.5E-03	M18	
CUMENE		NCGIE	ND[7.0E-04]	3.5E-04	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
3	2		ND to 1.5E-03	8.0E-04		
p-CYMENE		NCGB2	0.2 lb/hr	8.0E-03	M18	
p-CYMENE		NCGC1	ND to 0.1 lb/hr	1.5E-03	M18	
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
2	2		ND to 8.0E-03	4.8E-03		
DIMETHYL DISULFIDE		NCGC1	ND to 0.1 lb/hr	1.5E-03	M16	
DIMETHYL DISULFIDE		NCGIE	ND to 5.9E-04	4.4E-04	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
2	2		ND to 2.0E-03	9.8E-04		

TABLE 6 SUMMARY OF 'AIR TOXIC' EMISSIONS FROM UNCONTROLLED KRAFT NCG SOURCES, CONTD.

SOURCE: EVAPORATOR NCGs ONLY

VOLATILE ORGANIC COMPOUND		MILL CODE	EMISSIONS RANGE lb/ADTUBP	EMISSIONS AVG lb/ADTUBP	TEST METHOD	COMMENTS
DIMETHYL SULFIDE		NCGB2	35 to 169 lb/hr	2.4E+00	M16	
DIMETHYL SULFIDE		NCGC1	ND to 0.1 lb/hr	1.5E-03	M16	
DIMETHYL SULFIDE		NCGIE	ND to 1.7E-03	9.4E-04	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
3	3		ND to 4.0E+00	1.5E-03		
ETHANOL		NCGC1	ND to 0.1 lb/hr	1.5E-03	M18	
ETHANOL		NCGIE	ND[3.0E-04]	1.5E-04	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
2	1		ND to 2.0E-03	8.4E-04		
ETHYL BENZENE		NCGC1		ND [1.5E-3]	M18	
ETHYL BENZENE		NCGIE		ND[7.0E-04]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
2	0		ND	ND		
HEXANE-N		NCGIE		ND[5.0E-04]	HEATED CANISTER	FID
HYDROGEN SULFIDE		NCGB2	ND to 0.5 lb/hr	1.2E-02	M16	
HYDROGEN SULFIDE		NCGC1	ND to 0.1 lb/hr	1.5E-03	M16	
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
2	2		ND to 2.0E-02	6.8E-03		
ISOPROPANOL		NCGB2	0.1 to 0.4 lb/hr	1.2E-02	M18	
ISOPROPANOL		NCGC1	ND [1.5E-3]	7.5E-04	M18	
ISOPROPANOL		NCGIE	ND[4.0E-04]	2.0E-04	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
3	1		ND to 1.5E-02	7.5E-04		
METHANOL		NCGB2	2.8 to 10.5 lb/hr	2.6E-01	M18	
METHANOL		NCGC1	0.4 to 1.5 lb/hr	1.1E-02	M18	
METHANOL		NCGIE	9.7E-3 to 1.9E-2	1.4E-02	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
3	3		6.0E-3 to 4.2E-1	1.4E-02		
METHYLENE CHLORIDE		NCGIE		ND[5.0E-04]	HEATED CANISTER	FID
METHYL ETHYL KETONE		NCGB2	0.08 to 0.2 lb/hr	4.0E-03	M18	
METHYL ETHYL KETONE		NCGC1	ND [1.5E-3]	7.5E-04	M18	
METHYL ETHYL KETONE		NCGIE	ND[4.0E-04]	2.0E-04	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
3	1		ND to 8.0E-03	7.5E-04		
METHYL ISOBUTYL KETONE		NCGIE		ND[6.0E-04]	HEATED CANISTER	FID
METHYL MERCAPTAN		NCGB2	4.5 to 18.6 lb/hr	4.1E-01	M16	
METHYL MERCAPTAN		NCGC1	ND to 0.1 lb/hr	1.5E-03	M16	
METHYL MERCAPTAN		NCGIE	ND[3.0E-04]	1.5E-04	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
3	2		ND to 7.4E-01	1.5E-03		
PHENOL		NCGIE		ND[6.0E-04]	HEATED CANISTER	FID
TERPENES		NCGIE	ND to 8.4E-04	6.3E-04	HEATED CANISTER	FID
TOLUENE		NCGB2		ND[4.0E-03]	M18	
TOLUENE		NCGC1		ND[1.5E-03]	M18	

TABLE 6 SUMMARY OF 'AIR TOXIC' EMISSIONS FROM UNCONTROLLED KRAFT NCG SOURCES, CONTD.

SOURCE: EVAPORATOR NCGs ONLY

VOLATILE ORGANIC COMPOUND		MILL CODE	EMISSIONS RANGE lb/ADTUBP	EMISSIONS AVG lb/ADTUBP	TEST METHOD	COMMENTS
TOLUENE		NCGIE		ND[4.0E-04]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
3	0		ND	ND		
1,1,1 TRICHLOROETHANE		NCGIE		ND[8.0E-04]	HEATED CANISTER	FID
1,1,2 TRICHLOROETHANE		NCGIE		ND[8.0E-04]	HEATED CANISTER	FID
TRICHLOROETHYLENE		NCGIE		ND[8.0E-04]	HEATED CANISTER	FID
m,p-XYLENE		NCGC1		ND [1.5E-3]	M18	
m,p-XYLENE		NCGIE		ND[7.0E-04]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
2	0		ND	ND		
o-XYLENE		NCGC1		ND [1.5E-3]	M18	
o-XYLENE		NCGIE		ND[7.0E-04]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
2	0		ND	ND		

MEDIAN - empirical median

TABLE 6 SUMMARY OF 'AIR TOXIC' EMISSIONS FROM UNCONTROLLED KRAFT NCG SOURCES, CONTD.

SOURCE: STRIPPER GASES ONLY

VOLATILE ORGANIC COMPOUND	MILL CODE	EMISSIONS RANGE lb/ADTUBP	EMISSIONS AVG lb/ADTUBP	TEST METHOD	COMMENTS
ACETONE	NCGB3	0.016 to 0.44	1.9E-01	M18	
ALPHA-PINENE	NCGB3	0.3 to 0.5 lb/hr	1.6E-02	M18	
BETA-PINENE	NCGB3	0.4 to 0.5 lb/hr	1.6E-02	M18	
CARENE-3	NCGB3	0.01 to 0.02 lb/hr	4.0E-04	M18	
CUMENE	NCGB3		ND(4.0E-04)	M18	
p-CYMENE	NCGB3	0.1 to 0.2 lb/hr	4.0E-03	M18	
DIMETHYL SULFIDE	NCGB3	10.4 to 14.7 lb/hr	5.3E-01	M16	
ETHANOL	NCGB3	0.01 to 0.021 lb/hr	4.0E-04	M18	
ETHYL BENZENE	NCGB3		ND(4.0E-04)	M18	
HYDROGEN SULFIDE	NCGB3	4.3 to 5.8 lb/hr	2.0E-01	M16	
ISOPROPANOL	NCGB3	0.07 to 0.10 lb/hr	3.6E-03	M18	
METHANOL	NCGB3	2.2 to 7.04	5.4E+00	M18	
METHYL MERCAPTAN	NCGB3	21.2 to 25.3 lb/hr	9.0E-01	M16	
o-XYLENE	NCGB3		ND(4.0E-04)	M18	

MEDIAN - empirical median

TABLE 7 SUMMARY OF 'AIR TOXIC' EMISSIONS FROM KRAFT BLACK LIQUOR AND PULP STORAGE TANKS

MILL CODE	TEST DATE	SOURCE DESCRIPTION	PULP TYPE	OTHER INFORMATION	CAPACITY DAY	REF.
BLTMG1	1994	WEAK BLACK LIQUOR TANK	SW	71 DSCFM	1368 ODTPD	14
BLTMG2	1994	WEAK BLACK LIQUOR TANK	HW	129DSCFM	438 ODTPD	14
BLTMM	1994	WEAK BLACK LIQUOR TANK	SW	66 DSCFM	421 ODTPD	14
BLTMG3	1994	INTERMED. BLACK LIQUOR TANK	SW/HW/SC	16 DSCFM	1326 ODTPD	14
BLTMG4	1994	HEAVY BLACK LIQUOR TANK	SW/HW/SC	33 DSCFM	2587 ODTPD	14
BLTIB	1993	HEAVY BLACK LIQUOR TANK	HW	580 ACFM	750 ADTPD	9
BLTIH	1993	HEAVY BLACK LIQUOR TANK	SW/HW	517 ACFM	630 ADTPD	9
BLTII	1993	HEAVY BLACK LIQUOR TANK	SW/HW	427 DSCFM	1104 ADTPD	9
PSTMO1	1994	HIGH DENSITY PULP STORAGE TANK VENT	SW	BATCH DIGESTERS, 63 DSCFM	256 ODTPD	14
PSTMO2	1994	HIGH DENSITY PULP STORAGE TANK VENT	HW	BATCH DIGESTERS, 81 DSCFM	214 ODTPD	14
PSTIC	1993	WASH STOCK STORAGE TANK VENT	SW	FROM BSWs, 717 DSCFM	1253 ADTPD	9
PSTIE1	1993	SCREENED STOCK CHEST VENT	SW	BATCH DIGESTERS, 337 DSCFM	342 ADTPD	9
PSTIE2	1993	SCREENED STOCK CHEST VENT	HW	BATCH DIGESTERS, 200 DSCFM	425 ADTPD	9
PSTMG1*	1994	HIGH DENSITY PULP STORAGE CHEST VENT	SW	CONT. DIGESTER, 2967 DSCFM	1372 ODTPD	14
PSTMG2*	1994	HIGH DENSITY PULP STORAGE CHEST VENT	HW	CONT. DIGESTER, 3043 DSCFM	248 ODTPD	14

Notes

In the following tables, for less than 5 sources tested, if percent censory is less than or equal to 50%(i.e. more than half the observations are non-detect), then only those ND observations are included in the median determination (at half the detection limit) whose detection limits are less than or equal to twice the largest average detected observation.

SC - SEMI-CHEMICAL PULPING

* Data for these two pulp storage tanks are given in Reference 14. These data were not included in this table because the vent gas flow rates were unusually high.

References

9. Individual Mill Testing for `Air Toxics,' NCASI Mill File Information, 1994.

14. Volatile Organic Emissions from Pulp and Paper Mill Sources - Part III - Miscellaneous Sources at Kraft and TMP Mills, NCASI Technical Bulletin No. 677, September 1994.

TABLE 7 SUMMARY OF 'AIR TOXIC' EMISSIONS FROM KRAFT BLACK LIQUOR AND PULP STORAGE TANKS, CONTD.

SOURCE: WEAK BLACK LIQUOR STORAGE TANKS

VOLATILE ORGANIC COMPOUND		MILL CODE	EMISSIONS RANGE lb/hr/tank	EMISSIONS AVG lb/hr/tank	TEST METHOD	COMMENTS
ACETALDEHYDE		BLTMG1		3.2E-03	HEATED CANISTER	FID WITH CONCENTRATOR
ACETALDEHYDE		BLTMG2		8.1E-03	HEATED CANISTER	FID WITH CONCENTRATOR
ACETALDEHYDE		BLTMM		8.7E-05	HEATED CANISTER	FID WITH CONCENTRATOR
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
3	3		8.7E-05 to 5.1E-03	3.2E-03		
ACETONE		BLTMG1		1.6E-02	HEATED CANISTER	FID WITH CONCENTRATOR
ACETONE		BLTMG2		7.9E-02	HEATED CANISTER	FID WITH CONCENTRATOR
ACETONE		BLTMM		1.2E-03	HEATED CANISTER	FID WITH CONCENTRATOR
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
3	3		1.2E-03 to 7.9E-02	1.6E-02		
ACROLEIN		BLTMG1		5.5E-05	HEATED CANISTER	FID WITH CONCENTRATOR
ACROLEIN		BLTMG2		7.7E-04	HEATED CANISTER	FID WITH CONCENTRATOR
ACROLEIN		BLTMM		ND[1.7E-05]	HEATED CANISTER	FID WITH CONCENTRATOR
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
3	2		ND to 7.7E-04	5.5E-05		
BENZENE		BLTMG1		2.4E-05	HEATED CANISTER	FID WITH CONCENTRATOR
BENZENE		BLTMG2		5.4E-05	HEATED CANISTER	FID WITH CONCENTRATOR
BENZENE		BLTMM		ND[8.0E-06]	HEATED CANISTER	FID WITH CONCENTRATOR
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
3	2		ND to 5.4E-05	2.4E-05		
CARBON TETRACHLORIDE		BLTMG1		3.2E-04	HEATED CANISTER	FID WITH CONCENTRATOR, U
CARBON TETRACHLORIDE		BLTMG2		1.6E-03	HEATED CANISTER	FID WITH CONCENTRATOR, U
CARBON TETRACHLORIDE		BLTMM		ND[1.9E-04]	HEATED CANISTER	FID WITH CONCENTRATOR
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
3	2		ND to 1.6E-03	3.2E-04		
CHLOROBENZENE		BLTMG1	ND[1.3E-05]		HEATED CANISTER	FID WITH CONCENTRATOR
CHLOROBENZENE		BLTMG2	ND[2.5E-05]		HEATED CANISTER	FID WITH CONCENTRATOR
CHLOROBENZENE		BLTMM	ND[1.2E-05]		HEATED CANISTER	FID WITH CONCENTRATOR
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
3	0		ND	ND		
CHLOROFORM		BLTMG1	ND[1.6E-04]		HEATED CANISTER	FID WITH CONCENTRATOR
CHLOROFORM		BLTMG2	ND[3.2E-04]		HEATED CANISTER	FID WITH CONCENTRATOR
CHLOROFORM		BLTMM	ND[1.5E-04]		HEATED CANISTER	FID WITH CONCENTRATOR
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
3	0		ND	ND		
1,2-DICHLOROETHANE		BLTMG1	ND[4.5E-05]	2.3E-05	HEATED CANISTER	FID WITH CONCENTRATOR
1,2-DICHLOROETHANE		BLTMG2		5.3E-04	HEATED CANISTER	FID WITH CONCENTRATOR, U
1,2-DICHLOROETHANE		BLTMM	ND[4.0E-05]	2.0E-05	HEATED CANISTER	FID WITH CONCENTRATOR
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
3	1		ND to 5.3E-04	2.0E-05		
1,2-DICHLOROETHYLENE		BLTMG1		3.2E-04	HEATED CANISTER	FID WITH CONCENTRATOR, U
1,2-DICHLOROETHYLENE		BLTMG2		6.9E-04	HEATED CANISTER	FID WITH CONCENTRATOR, U
1,2-DICHLOROETHYLENE		BLTMM		4.1E-05	HEATED CANISTER	FID WITH CONCENTRATOR, U
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
3	3		4.1E-05 to 6.9E-04	3.2E-04		
DIMETHYL DISULFIDE		BLTMG1		1.2E-02	HEATED CANISTER	FID WITH CONCENTRATOR
DIMETHYL DISULFIDE		BLTMG2		6.9E-02	HEATED CANISTER	FID WITH CONCENTRATOR
DIMETHYL DISULFIDE		BLTMM		ND[4.8E-04]	HEATED CANISTER	FID WITH CONCENTRATOR
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
3	2		ND to 6.9E-02	1.2E-02		

TABLE 7 SUMMARY OF 'AIR TOXIC' EMISSIONS FROM KRAFT BLACK LIQUOR AND PULP STORAGE TANKS, CONTD.

SOURCE: WEAK BLACK LIQUOR STORAGE TANKS

			EMISSIONS			
VOLATILE ORGANIC COMPOUND		MILL CODE	RANGE lb/hr/tank	AVG lb/hr/tank	TEST METHOD	COMMENTS
DIMETHYL SULFIDE		BLTMG1		4.1E-02	HEATED CANISTER	FID WITH CONCENTRATOR
DIMETHYL SULFIDE		BLTMG2		2.4E-01	HEATED CANISTER	FID WITH CONCENTRATOR
DIMETHYL SULFIDE		BLTMM		5.2E-04	HEATED CANISTER	FID WITH CONCENTRATOR
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
3	3		5.2E-04 to 2.4E-01	4.1E-02		
FORMALDEHYDE		BLTMG1	ND[2.0E-04]		IMPINGER	NCASI METHOD
FORMALDEHYDE		BLTMG2	ND[3.4E-04]		IMPINGER	NCASI METHOD
FORMALDEHYDE		BLTMM	ND[6.2E-04]		IMPINGER	NCASI METHOD
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
3	0		ND	ND		
n-HEXANE		BLTMG1		7.2E-05	HEATED CANISTER	FID WITH CONCENTRATOR
n-HEXANE		BLTMG2		1.0E-03	HEATED CANISTER	FID WITH CONCENTRATOR
n-HEXANE		BLTMM		ND[8.8E-06]	HEATED CANISTER	FID WITH CONCENTRATOR
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
3	2		ND to 1.0E-03	7.2E-05		
METHANOL		BLTMG1		7.1E-01	HEATED CANISTER	FID WITH CONCENTRATOR
METHANOL		BLTMG2		1.3E+00	HEATED CANISTER	FID WITH CONCENTRATOR
METHANOL		BLTMM		3.4E-03	HEATED CANISTER	FID WITH CONCENTRATOR
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
3	3		3.4E-03 to 1.3	7.1E-01		
METHYL ETHYL KETONE		BLTMG1		4.4E-03	HEATED CANISTER	FID WITH CONCENTRATOR
METHYL ETHYL KETONE		BLTMG2		2.1E-02	HEATED CANISTER	FID WITH CONCENTRATOR
METHYL ETHYL KETONE		BLTMM		ND[2.8E-05]	HEATED CANISTER	FID WITH CONCENTRATOR
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
3	2		ND to 2.1E-02	4.4E-03		
METHYL ISOBUTYL KETONE		BLTMG1		2.9E-04	HEATED CANISTER	FID WITH CONCENTRATOR
METHYL ISOBUTYL KETONE		BLTMG2		7.6E-04	HEATED CANISTER	FID WITH CONCENTRATOR
METHYL ISOBUTYL KETONE		BLTMM		ND[9.0E-06]	HEATED CANISTER	FID WITH CONCENTRATOR
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
3	2		ND to 7.6E-04	2.9E-04		
METHYL MERCAPTAN		BLTMG1	ND[2.7E-04]	1.4E-04	HEATED CANISTER	FID WITH CONCENTRATOR
METHYL MERCAPTAN		BLTMG2		3.7E-03	HEATED CANISTER	FID WITH CONCENTRATOR
METHYL MERCAPTAN		BLTMM	ND[2.5E-04]	1.3E-04	HEATED CANISTER	FID WITH CONCENTRATOR
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
3	1		ND to 3.7E-03	1.4E-04		
METHYLENE CHLORIDE		BLTMG1	ND[8.2E-05]		HEATED CANISTER	FID WITH CONCENTRATOR
METHYLENE CHLORIDE		BLTMG2	ND[1.6E-04]		HEATED CANISTER	FID WITH CONCENTRATOR
METHYLENE CHLORIDE		BLTMM	ND[7.4E-05]		HEATED CANISTER	FID WITH CONCENTRATOR
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
3	0		ND	ND		
STYRENE		BLTMG1		3.5E-04	HEATED CANISTER	FID WITH CONCENTRATOR
STYRENE		BLTMG2		ND[2.3E-05]	HEATED CANISTER	FID WITH CONCENTRATOR
STYRENE		BLTMM		2.4E-04	HEATED CANISTER	FID WITH CONCENTRATOR
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
3	2		ND to 3.5E-04	2.4E-04		
TETRACHLOROETHYLENE		BLTMG1		1.3E-04	HEATED CANISTER	FID WITH CONCENTRATOR, U
TETRACHLOROETHYLENE		BLTMG2	ND[1.1E-04]	5.5E-05	HEATED CANISTER	FID WITH CONCENTRATOR
TETRACHLOROETHYLENE		BLTMM	ND[5.1E-05]	2.6E-05	HEATED CANISTER	FID WITH CONCENTRATOR
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
3	1		ND to 1.3E-04	5.5E-05		

TABLE 7 SUMMARY OF 'AIR TOXIC' EMISSIONS FROM KRAFT BLACK LIQUOR AND PULP STORAGE TANKS, CONTD.

SOURCE: WEAK BLACK LIQUOR STORAGE TANKS

VOLATILE ORGANIC COMPOUND		MILL CODE	EMISSIONS RANGE lb/hr/tank	EMISSIONS AVG lb/hr/tank	TEST METHOD	COMMENTS
TOLUENE		BLTMG1		1.8E-04	HEATED CANISTER	FID WITH CONCENTRATOR, U
TOLUENE		BLTMG2		2.0E-03	HEATED CANISTER	FID WITH CONCENTRATOR
TOLUENE		BLTMM	ND[7.4E-06]	3.7E-06	HEATED CANISTER	FID WITH CONCENTRATOR
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
3	2		ND to 2.0E-03	1.8E-04		
1,2,4-TRICHLOROBENZENE		BLTMG1	ND[2.0E-05]	1.0E-05	HEATED CANISTER	FID WITH CONCENTRATOR
1,2,4-TRICHLOROBENZENE		BLTMG2	ND[4.0E-05]	2.0E-05	HEATED CANISTER	FID WITH CONCENTRATOR
1,2,4-TRICHLOROBENZENE		BLTMM		1.4E-04	HEATED CANISTER	FID WITH CONCENTRATOR, U
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
3	2		ND to 1.4E-04	2.0E-05		
1,1,1-TRICHLOROETHANE		BLTMG1		2.0E-04	HEATED CANISTER	FID WITH CONCENTRATOR, U
1,1,1-TRICHLOROETHANE		BLTMG2		5.3E-04	HEATED CANISTER	FID WITH CONCENTRATOR, U
1,1,1-TRICHLOROETHANE		BLTMM		ND[4.1E-05]	HEATED CANISTER	FID WITH CONCENTRATOR
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
3	2		ND to 5.3E-04	2.0E-04		
1,1,2-TRICHLOROETHANE		BLTMG1	ND[4.5E-05]		HEATED CANISTER	FID WITH CONCENTRATOR
1,1,2-TRICHLOROETHANE		BLTMG2	ND[8.9E-05]		HEATED CANISTER	FID WITH CONCENTRATOR
1,1,2-TRICHLOROETHANE		BLTMM	ND[4.1E-05]		HEATED CANISTER	FID WITH CONCENTRATOR
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
3	0		ND	ND		
TRICHLOROETHYLENE		BLTMG1		1.3E-04	HEATED CANISTER	FID WITH CONCENTRATOR, U
TRICHLOROETHYLENE		BLTMG2		2.3E-04	HEATED CANISTER	FID WITH CONCENTRATOR, U
TRICHLOROETHYLENE		BLTMM		ND[4.0E-05]	HEATED CANISTER	FID WITH CONCENTRATOR
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
3	2		ND to 2.3E-04	1.3E-04		
m,p-XYLENE		BLTMG1		2.3E-04	HEATED CANISTER	FID WITH CONCENTRATOR
m,p-XYLENE		BLTMG2		7.2E-04	HEATED CANISTER	FID WITH CONCENTRATOR
m,p-XYLENE		BLTMM		ND[1.1E-05]	HEATED CANISTER	FID WITH CONCENTRATOR
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
3	2		ND to 2.3E-04	2.3E-04		
o-XYLENE		BLTMG1		5.6E-04	HEATED CANISTER	FID WITH CONCENTRATOR
o-XYLENE		BLTMG2		4.5E-04	HEATED CANISTER	FID WITH CONCENTRATOR
o-XYLENE		BLTMM		ND[1.1E-05]	HEATED CANISTER	FID WITH CONCENTRATOR
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
3	2		ND to 5.6E-04	4.5E-04		
TERPENES		BLTMG1		1.4E-01	HEATED CANISTER	FID WITH CONCENTRATOR
TERPENES		BLTMG2		1.8E+00	HEATED CANISTER	FID WITH CONCENTRATOR
TERPENES		BLTMM		4.1E-02	HEATED CANISTER	FID WITH CONCENTRATOR
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
3	3		4.1E-02 to 1.8	1.4E-01		
			lb C/hr/tank	lb C/hr/tank		
TOTAL HYDROCARBONS		BLTMG1		5.9E-01	M25A	
TOTAL HYDROCARBONS		BLTMG2		1.8E+00	M25A	
TOTAL HYDROCARBONS		BLTMM		2.0E-02	M25A	
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
3	3		2.0E-02 to 1.6	5.9E-01		

MEDIAN - empirical median

TABLE 7 SUMMARY OF 'AIR TOXIC' EMISSIONS FROM KRAFT BLACK LIQUOR AND PULP STORAGE TANKS, CONTD.

SOURCE: ONE INTERMEDIATE & FOUR HEAVY BLACK LIQUOR STORAGE TANKS

VOLATILE ORGANIC COMPOUND		MILL CODE	EMISSIONS RANGE lb/hr/tank	AVG lb/hr/tank	TEST METHOD	COMMENTS
ACETALDEHYDE		BLTMG3		1.7E-02	HEATED CANISTER	FID WITH CONCENTRATOR
ACETALDEHYDE		BLTMG4		1.2E-02	HEATED CANISTER	FID WITH CONCENTRATOR
ACETALDEHYDE		BLTIB	0.024 to 0.042	3.4E-02	HEATED CANISTER	FID
ACETALDEHYDE		BLTIH	0.053 to 0.114	7.4E-02	HEATED CANISTER	FID
ACETALDEHYDE		BLTII	0.017 to 0.024	2.0E-02	HEATED CANISTER	2.6E-02 by DNPH METHOD
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
5	5		0.012 to 0.114	2.0E-02		
ACETONE		BLTMG3		2.3E-02	HEATED CANISTER	FID WITH CONCENTRATOR
ACETONE		BLTMG4		2.8E-02	HEATED CANISTER	FID WITH CONCENTRATOR
ACETONE		BLTIB	0.024 to 0.038	3.3E-02	HEATED CANISTER	FID
ACETONE		BLTIH	0.073 to 0.089	7.9E-02	HEATED CANISTER	FID
ACETONE		BLTII	0.0226 to 0.0359	2.7E-02	HEATED CANISTER	1.5E-02 by DNPH METHOD
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
5	5		0.023 to 0.089	2.8E-02		
ACETOPHENONE		BLTIB		ND[9.4E-03]	HEATED CANISTER	FID
ACETOPHENONE		BLTIH		ND[3.4E-02]	HEATED CANISTER	FID
ACETOPHENONE		BLTII		ND[1.4E-02]	HEATED CANISTER	1.4E-04 by DNPH METHOD
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
3	0		ND	ND		
ACROLEIN		BLTMG3	ND[9.4E-06]	4.7E-06	HEATED CANISTER	FID WITH CONCENTRATOR
ACROLEIN		BLTMG4		3.1E-05	HEATED CANISTER	FID WITH CONCENTRATOR
ACROLEIN		BLTIB	ND[3.1E-03]		HEATED CANISTER	FID
ACROLEIN		BLTIH	ND[3.4E-02]		HEATED CANISTER	FID
ACROLEIN		BLTII	ND[4.6E-03]		HEATED CANISTER	ND[1.8E-04] by DNPH METHOD
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
5	1		ND to 3.1E-05	1.8E-05		
BENZALDEHYDE		BLTII		ND[1.4E-04]	IMPINGER	DNPH METHOD
BENZENE		BLTMG3		9.0E-06	HEATED CANISTER	FID WITH CONCENTRATOR
BENZENE		BLTMG4		1.1E-05	HEATED CANISTER	FID WITH CONCENTRATOR
BENZENE		BLTIB	ND[6.3E-03]		HEATED CANISTER	FID
BENZENE		BLTIH	ND[4.5E-02]		HEATED CANISTER	FID
BENZENE		BLTII	ND[9.2E-03]		HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
5	2		ND to 1.1E-05	1.0E-05		
CARBON DISULFIDE		BLTII		ND[9.2E-03]		FPD
CARBON TETRACHLORIDE		BLTMG3		ND[1.0E-04]	HEATED CANISTER	FID WITH CONCENTRATOR, U
CARBON TETRACHLORIDE		BLTMG4		ND[1.6E-04]	HEATED CANISTER	FID WITH CONCENTRATOR, U
CARBON TETRACHLORIDE		BLTIB		ND[1.3E-02]	HEATED CANISTER	FID
CARBON TETRACHLORIDE		BLTIH		ND[8.9E-02]	HEATED CANISTER	FID
CARBON TETRACHLORIDE		BLTII		ND[1.8E-02]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
5	0		ND	ND		
CARBONYL SULFIDE		BLTII		ND[1.4E-02]		FPD
CHLOROBENZENE		BLTMG3		ND[6.3E-06]	HEATED CANISTER	FID WITH CONCENTRATOR
CHLOROBENZENE		BLTMG4		ND[9.8E-06]	HEATED CANISTER	FID WITH CONCENTRATOR
CHLOROBENZENE		BLTIB		ND[9.4E-03]	HEATED CANISTER	FID
CHLOROBENZENE		BLTIH		ND[6.6E-02]	HEATED CANISTER	FID
CHLOROBENZENE		BLTII		ND[1.4E-02]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
5	0		ND	ND		
CHLOROFORM		BLTMG3		1.4E-04	HEATED CANISTER	FID WITH CONCENTRATOR
CHLOROFORM		BLTMG4		1.0E-03	HEATED CANISTER	FID WITH CONCENTRATOR
CHLOROFORM		BLTIB		ND[1.9E-02]	HEATED CANISTER	FID
CHLOROFORM		BLTIH	ND to 0.142	9.4E-02	HEATED CANISTER	FID

TABLE 7 SUMMARY OF 'AIR TOXIC' EMISSIONS FROM KRAFT BLACK LIQUOR AND PULP STORAGE TANKS, CONTD.

SOURCE: ONE INTERMEDIATE & FOUR HEAVY BLACK LIQUOR STORAGE TANKS

VOLATILE ORGANIC COMPOUND		MILL CODE	EMISSIONS RANGE lb/hr/tank	EMISSIONS AVG lb/hr/tank	TEST METHOD	COMMENTS
CHLOROFORM		BLTII		ND[2.8E-02]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
5	3		ND to 9.4E-02	1.4E-04		
o-CRESOL		BLTIB		ND[9.4E-03]	HEATED CANISTER	FID
o-CRESOL		BLTIH		ND[6.3E-02]	HEATED CANISTER	FID
o-CRESOL		BLTII		ND[1.4E-02]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
3	0		ND	ND		
CROTONALDEHYDE		BLTII	2.8E-04 to 3.2E-04	2.8E-04	IMPINGER	DNPH METHOD
CUMENE		BLTIB		ND[9.4E-03]	HEATED CANISTER	FID
CUMENE		BLTIH		ND[7.1E-02]	HEATED CANISTER	FID
CUMENE		BLTII		ND[1.4E-02]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
3	0		ND	ND		
1,2-DICHLOROETHANE		BLTMG3		ND[2.2E-05]	HEATED CANISTER	FID WITH CONCENTRATOR
1,2-DICHLOROETHANE		BLTMG4		ND[3.4E-05]	HEATED CANISTER	FID WITH CONCENTRATOR, U
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
2	0		ND	ND		
1,2-DICHLOROETHYLENE		BLTMG3	ND[1.8E-05]	8.0E-06	HEATED CANISTER	FID WITH CONCENTRATOR, U
1,2-DICHLOROETHYLENE		BLTMG4		9.7E-05	HEATED CANISTER	FID WITH CONCENTRATOR, U
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
2	1		ND to 9.7E-05	5.3E-05		
DIMETHYL DISULFIDE		BLTMG3		1.3E-02	HEATED CANISTER	FID WITH CONCENTRATOR
DIMETHYL DISULFIDE		BLTMG4		5.5E-02	HEATED CANISTER	FID WITH CONCENTRATOR
DIMETHYL DISULFIDE		BLTIB		ND[6.3E-03]	HEATED CANISTER	FID
DIMETHYL DISULFIDE		BLTIH	0.168 to 0.725	3.6E-01	HEATED CANISTER	FID
DIMETHYL DISULFIDE		BLTII	0.024 to 0.117	7.4E-02	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
5	4		ND to 0.73	5.5E-02		
DIMETHYL SULFIDE		BLTMG3		6.9E-02	HEATED CANISTER	FID WITH CONCENTRATOR
DIMETHYL SULFIDE		BLTMG4		1.2E-01	HEATED CANISTER	FID WITH CONCENTRATOR
DIMETHYL SULFIDE		BLTIB	0.036 to 0.057	4.9E-02	HEATED CANISTER	FID
DIMETHYL SULFIDE		BLTIH	0.47 to 0.855	5.8E-01	HEATED CANISTER	FID
DIMETHYL SULFIDE		BLTII	0.045 to 0.055	5.1E-02	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
5	5		0.045 to 0.855	6.9E-02		
ETHANOL		BLTIB	0.02 to 0.033	2.7E-02	HEATED CANISTER	FID
ETHANOL		BLTIH		NS[2.6E-02]	HEATED CANISTER	FID
ETHANOL		BLTII	0.0064 to 0.0083	7.4E-03	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
3	2		ND to 3.3E-02	7.4E-03		
ETHYL BENZENE		BLTIB		ND[9.4E-03]	HEATED CANISTER	FID
ETHYL BENZENE		BLTIH		ND[6.3E-02]	HEATED CANISTER	FID
ETHYL BENZENE		BLTII		ND[9.2E-03]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
3	0		ND	ND		
FORMALDEHYDE		BLTMG3		2.3E-04	IMPINGER	NCASI METHOD
FORMALDEHYDE		BLTMG4		5.0E-04	IMPINGER	NCASI METHOD
FORMALDEHYDE		BLTII		9.2E-04	IMPINGER	DNPH
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
3	3		2.3E-04 to 9.2E-04	5.0E-04		

TABLE 7 SUMMARY OF 'AIR TOXIC' EMISSIONS FROM KRAFT BLACK LIQUOR AND PULP STORAGE TANKS, CONTD.

SOURCE: ONE INTERMEDIATE & FOUR HEAVY BLACK LIQUOR STORAGE TANKS

VOLATILE ORGANIC COMPOUND		MILL CODE	EMISSIONS RANGE lb/hr/tank	EMISSIONS AVG lb/hr/tank	TEST METHOD	COMMENTS
n-HEXANE		BLTMG3		3.4E-05	HEATED CANISTER	FID WITH CONCENTRATOR
n-HEXANE		BLTMG4		4.1E-05	HEATED CANISTER	FID WITH CONCENTRATOR
n-HEXANE		BLTIB	ND[6.3E-03]		HEATED CANISTER	FID
n-HEXANE		BLTIH	ND[5.0E-02]		HEATED CANISTER	FID
n-HEXANE		BLTII	ND[9.2E-03]		HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
5	2		ND to 4.1E-05	3.8E-05		
HYDROGEN SULFIDE		BLTII	0.0396 to 0.0548	4.8E-02		FPD
METHANOL		BLTMG3		9.2E-02	HEATED CANISTER	FID WITH CONCENTRATOR
METHANOL		BLTMG4		1.3E-01	HEATED CANISTER	FID WITH CONCENTRATOR
METHANOL		BLTIB	0.093 to 0.134	1.2E-01	HEATED CANISTER	FID
METHANOL		BLTIH	0.297 to 0.468	3.6E-01	HEATED CANISTER	FID
METHANOL		BLTII	0.118 to 1.20	4.8E-01	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
5	5		0.092 to 1.20	1.3E-01		
METHYL ETHYL KETONE		BLTMG3		1.8E-02	HEATED CANISTER	FID WITH CONCENTRATOR
METHYL ETHYL KETONE		BLTMG4		1.5E-02	HEATED CANISTER	FID WITH CONCENTRATOR
METHYL ETHYL KETONE		BLTIB	0.0066 to 0.014	1.1E-02	HEATED CANISTER	FID
METHYL ETHYL KETONE		BLTIH		ND[4.2E-02]	HEATED CANISTER	FID
METHYL ETHYL KETONE		BLTII		ND[9.2E-03]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
5	3		ND to 1.8E-02	1.1E-02		
METHYL ISOBUTYL KETONE		BLTMG3		7.0E-05	HEATED CANISTER	FID WITH CONCENTRATOR
METHYL ISOBUTYL KETONE		BLTMG4		7.3E-05	HEATED CANISTER	FID WITH CONCENTRATOR
METHYL ISOBUTYL KETONE		BLTIB	ND[6.3E-03]		HEATED CANISTER	FID WITH CONCENTRATOR
METHYL ISOBUTYL KETONE		BLTIH	ND[5.8E-02]		HEATED CANISTER	FID
METHYL ISOBUTYL KETONE		BLTII	ND[9.2E-03]		HEATED CANISTER	6.0E-06 by DNPH METHOD
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
5	2		ND to 7.3E-05	7.2E-05		
METHYL MERCAPTAN		BLTMG3		8.0E-04	HEATED CANISTER	FID WITH CONCENTRATOR
METHYL MERCAPTAN		BLTMG4		8.0E-03	HEATED CANISTER	FID WITH CONCENTRATOR
METHYL MERCAPTAN		BLTIB		ND[3.1E-03]	HEATED CANISTER	FID
METHYL MERCAPTAN		BLTIH	ND to 2.11	1.2E+00	HEATED CANISTER	FID
METHYL MERCAPTAN		BLTII	0.087 to 0.172	1.2E-01	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
5	4		ND to 2.11	8.0E-03		
METHYLENE CHLORIDE		BLTMG3		ND[4.0E-05]	HEATED CANISTER	FID WITH CONCENTRATOR
METHYLENE CHLORIDE		BLTMG4		ND[6.3E-05]	HEATED CANISTER	FID WITH CONCENTRATOR
METHYLENE CHLORIDE		BLTIB		ND[6.3E-03]	HEATED CANISTER	FID
METHYLENE CHLORIDE		BLTIH		ND[5.0E-02]	HEATED CANISTER	FID
METHYLENE CHLORIDE		BLTII		ND[9.2E-03]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
5	0		ND	ND		
PHENOL		BLTIB	ND[6.3E-03]	3.2E-03	HEATED CANISTER	FID
PHENOL		BLTIH	0.108 to 0.256	1.7E-01	HEATED CANISTER	FID
PHENOL		BLTII	ND[9.2E-03]	4.6E-03	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
3	1		ND to 0.256	4.6E-03		
PROPIONALDEHYDE		BLTII	1.8E-03 to 2.3E-03	2.3E-03	IMPINGER	DNPH METHOD
STYRENE		BLTMG3		1.5E-04	HEATED CANISTER	FID WITH CONCENTRATOR
STYRENE		BLTMG4		1.3E-04	HEATED CANISTER	FID WITH CONCENTRATOR
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
2	2		1.3E-04 to 1.5E-04	1.4E-04		

TABLE 7 SUMMARY OF 'AIR TOXIC' EMISSIONS FROM KRAFT BLACK LIQUOR AND PULP STORAGE TANKS, CONTD.

SOURCE: ONE INTERMEDIATE & FOUR HEAVY BLACK LIQUOR STORAGE TANKS

VOLATILE ORGANIC COMPOUND		MILL CODE	EMISSIONS RANGE lb/hr/tank	EMISSIONS AVG lb/hr/tank	TEST METHOD	COMMENTS
TETRACHLOROETHYLENE		BLTMG3		ND[2.2E-05]	HEATED CANISTER	FID WITH CONCENTRATOR, U
TETRACHLOROETHYLENE		BLTMG4		ND[3.5E-05]	HEATED CANISTER	FID WITH CONCENTRATOR
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
2	0		ND	ND		
TOLUENE		BLTMG3		1.9E-04	HEATED CANISTER	FID WITH CONCENTRATOR, U
TOLUENE		BLTMG4		2.8E-04	HEATED CANISTER	FID WITH CONCENTRATOR
TOLUENE		BLTIB	ND to 0.012	8.8E-03	HEATED CANISTER	FID
TOLUENE		BLTIH		ND[5.5E-02]	HEATED CANISTER	FID
TOLUENE		BLTII		ND[9.2E-03]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
5	3		ND to 1.2E-02	1.9E-04		
1,2,4-TRICHLOROBENZENE		BLTMG3		3.5E-05	HEATED CANISTER	FID WITH CONCENTRATOR, U
1,2,4-TRICHLOROBENZENE		BLTMG4		4.1E-04	HEATED CANISTER	FID WITH CONCENTRATOR, U
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
2	2		3.5E-05 to 4.1E-04	2.2E-04		
1,1,1-TRICHLOROETHANE		BLTMG3		ND[2.2E-05]	HEATED CANISTER	FID WITH CONCENTRATOR, U
1,1,1-TRICHLOROETHANE		BLTMG4		ND[3.5E-05]	HEATED CANISTER	FID WITH CONCENTRATOR, U
1,1,1-TRICHLOROETHANE		BLTIB		ND[9.4E-03]	HEATED CANISTER	FID
1,1,1-TRICHLOROETHANE		BLTIH		ND[7.9E-02]	HEATED CANISTER	FID
1,1,1-TRICHLOROETHANE		BLTII		ND[1.4E-02]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
5	0		ND	ND		
1,1,2-TRICHLOROETHANE		BLTMG3		ND[2.2E-05]	HEATED CANISTER	FID WITH CONCENTRATOR
1,1,2-TRICHLOROETHANE		BLTMG4		ND[3.5E-05]	HEATED CANISTER	FID WITH CONCENTRATOR
1,1,2-TRICHLOROETHANE		BLTIB		ND[9.4E-03]	HEATED CANISTER	FID
1,1,2-TRICHLOROETHANE		BLTIH		ND[7.9E-02]	HEATED CANISTER	FID
1,1,2-TRICHLOROETHANE		BLTII		ND[1.4E-02]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
5	0		ND	ND		
TRICHLOROETHYLENE		BLTMG3		ND[2.2E-05]	HEATED CANISTER	FID WITH CONCENTRATOR, U
TRICHLOROETHYLENE		BLTMG4		ND[3.4E-05]	HEATED CANISTER	FID WITH CONCENTRATOR, U
TRICHLOROETHYLENE		BLTIB		ND[9.4E-03]	HEATED CANISTER	FID
TRICHLOROETHYLENE		BLTIH		ND[7.8E-02]	HEATED CANISTER	FID
TRICHLOROETHYLENE		BLTII		ND[1.4E-02]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
5	0		ND	ND		
m,p-XYLENE		BLTMG3		2.7E-05	HEATED CANISTER	FID WITH CONCENTRATOR
m,p-XYLENE		BLTMG4		3.3E-05	HEATED CANISTER	FID WITH CONCENTRATOR
m,p-XYLENE		BLTIB	ND[9.4E-03]		HEATED CANISTER	FID
m,p-XYLENE		BLTIH	ND[6.3E-02]		HEATED CANISTER	FID
m,p-XYLENE		BLTII	ND[9.2E-03]		HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
5	2		ND to 3.3E-05	3.0E-05		
o-XYLENE		BLTMG3		6.8E-05	HEATED CANISTER	FID WITH CONCENTRATOR
o-XYLENE		BLTMG4		7.3E-05	HEATED CANISTER	FID WITH CONCENTRATOR
o-XYLENE		BLTIB	ND[9.4E-03]		HEATED CANISTER	FID
o-XYLENE		BLTIH	ND[6.3E-02]		HEATED CANISTER	FID
o-XYLENE		BLTII	ND[9.2E-03]		HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
5	2		ND to 7.3E-05	7.1E-05		
TERPENES		BLTMG3		5.8E-03	HEATED CANISTER	FID WITH CONCENTRATOR
TERPENES		BLTMG4		9.9E-03	HEATED CANISTER	FID WITH CONCENTRATOR
TERPENES		BLTIB		ND[9.4E-03]	HEATED CANISTER	FID
TERPENES		BLTIH		ND[7.9E-02]	HEATED CANISTER	FID

TABLE 7 SUMMARY OF 'AIR TOXIC' EMISSIONS FROM KRAFT BLACK LIQUOR AND PULP STORAGE TANKS, CONTD.

SOURCE: ONE INTERMEDIATE & FOUR HEAVY BLACK LIQUOR STORAGE TANKS

VOLATILE ORGANIC COMPOUND		MILL CODE	EMISSIONS RANGE lb/hr/tank	EMISSIONS AVG lb/hr/tank	TEST METHOD	COMMENTS
TERPENES		BLTII	ND to 0.0589	3.8E-02	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
5	3		ND to 5.9E-02	5.8E-03		
			lb C/hr/tank	lb C/hr/tank		
TOTAL HYDROCARBONS		BLTMG3		9.1E-02	M25A	
TOTAL HYDROCARBONS		BLTMG4		1.8E-01	M25A	
TOTAL HYDROCARBONS		BLTIB	0.016 to 0.021	1.8E-02	M25A	
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
3	3		1.6E-02 to 1.8E-01	9.1E-02		

MEDIAN - empirical median

TABLE 7 SUMMARY OF 'AIR TOXIC' EMISSIONS FROM KRAFT BLACK LIQUOR AND PULP STORAGE TANKS, CONTD.

SOURCE: HIGH DENSITY PULP STORAGE TANKS

VOLATILE ORGANIC COMPOUND		MILL CODE	EMISSIONS RANGE lb/hr/tank	EMISSIONS AVG lb/hr/tank	TEST METHOD	COMMENTS
ACETALDEHYDE		PSTMO1		5.1E-04	HEATED CANISTER	FID WITH CONCENTRATOR
ACETALDEHYDE		PSTMO2		5.2E-03	HEATED CANISTER	FID WITH CONCENTRATOR
ACETALDEHYDE		PSTIC	0.024 to 0.042	3.4E-02	HEATED CANISTER	FID
ACETALDEHYDE		PSTIE1	0.053 to 0.114	7.4E-02	HEATED CANISTER	FID
ACETALDEHYDE		PSTIE2	0.017 to 0.024	2.0E-02	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
5	5		5.2E-03 to 0.114	2.0E-02		
ACETONE		PSTMO1		1.8E-03	HEATED CANISTER	FID WITH CONCENTRATOR
ACETONE		PSTMO2		1.2E-02	HEATED CANISTER	FID WITH CONCENTRATOR
ACETONE		PSTIC	0.024 to 0.038	3.3E-02	HEATED CANISTER	FID
ACETONE		PSTIE1	0.073 to 0.089	7.9E-02	HEATED CANISTER	FID
ACETONE		PSTIE2	0.025 to 0.028	2.7E-02	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
5	5		1.8E-03 to 0.089	2.7E-02		
ACETOPHENONE		PSTIC		ND[5.7E-02]	HEATED CANISTER	FID
ACETOPHENONE		PSTIE1		ND[3.4E-02]	HEATED CANISTER	FID
ACETOPHENONE		PSTIE2		ND[5.3E-03]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
3	0		ND	ND		
ACROLEIN		PSTMO1		ND[3.1E-05]	HEATED CANISTER	FID WITH CONCENTRATOR
ACROLEIN		PSTMO2		ND[2.3E-05]	HEATED CANISTER	FID WITH CONCENTRATOR
ACROLEIN		PSTIC		ND[3.1E-03]	HEATED CANISTER	FID
ACROLEIN		PSTIE1		ND[3.4E-02]	HEATED CANISTER	FID
ACROLEIN		PSTIE2		ND[4.8E-03]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
5	0		ND	ND		
BENZALDEHYDE		PSTIE2		ND[1.4E-04]	IMPINGER	DNPH METHOD
BENZENE		PSTMO1		2.1E-05	HEATED CANISTER	FID WITH CONCENTRATOR
BENZENE		PSTMO2		1.4E-05	HEATED CANISTER	FID WITH CONCENTRATOR
BENZENE		PSTIC	ND[3.7E-02]		HEATED CANISTER	FID
BENZENE		PSTIE1	ND[7.1E-03]		HEATED CANISTER	FID
BENZENE		PSTIE2	ND[3.5E-03]		HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
5	2		ND to 2.1E-05	1.8E-05		
CARBON DISULFIDE		PSTIC		ND[4.2E-03]		FPD
CARBON TETRACHLORIDE		PSTMO1		ND[3.4E-04]	HEATED CANISTER	FID WITH CONCENTRATOR, U
CARBON TETRACHLORIDE		PSTMO2		ND[2.5E-04]	HEATED CANISTER	FID WITH CONCENTRATOR, U
CARBON TETRACHLORIDE		PSTIC		ND[7.3E-02]	HEATED CANISTER	FID
CARBON TETRACHLORIDE		PSTIE1		ND[1.4E-02]	HEATED CANISTER	FID
CARBON TETRACHLORIDE		PSTIE2		ND[7.1E-03]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
5	0		ND	ND		
CARBONYL SULFIDE		PSTIC		ND[3.1E-03]		FPD
CHLOROBENZENE		PSTMO1	ND[2.1E-05]	1.1E-05	HEATED CANISTER	FID WITH CONCENTRATOR
CHLOROBENZENE		PSTMO2		2.0E-05	HEATED CANISTER	FID WITH CONCENTRATOR, U
CHLOROBENZENE		PSTIC	ND[5.2E-02]		HEATED CANISTER	FID
CHLOROBENZENE		PSTIE1	ND[1.0E-02]		HEATED CANISTER	FID
CHLOROBENZENE		PSTIE2	ND[5.3E-03]		HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
5	1		ND to 2.0E-05	1.5E-05		
CHLOROFORM		PSTMO1		1.3E-04	HEATED CANISTER	FID WITH CONCENTRATOR
CHLOROFORM		PSTMO2		2.7E-04	HEATED CANISTER	FID WITH CONCENTRATOR
CHLOROFORM		PSTIC	ND[1.1E-01]	5.5E-02	HEATED CANISTER	FID
CHLOROFORM		PSTIE1	ND[2.1E-02]	1.1E-02	HEATED CANISTER	FID

TABLE 7 SUMMARY OF 'AIR TOXIC' EMISSIONS FROM KRAFT BLACK LIQUOR AND PULP STORAGE TANKS, CONTD.

SOURCE: HIGH DENSITY PULP STORAGE TANKS

			EMISSIONS			
VOLATILE ORGANIC COMPOUND		MILL CODE	RANGE lb/hr/tank	AVG lb/hr/tank	TEST METHOD	COMMENTS
CHLOROFORM		PSTIE2	0.085 to 0.103	9.4E-02	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
5	3		ND to 9.4E-02	1.1E-02		
o-CRESOL		PSTIC		ND[5.2E-02]	HEATED CANISTER	FID
o-CRESOL		PSTIE1		ND[1.0E-02]	HEATED CANISTER	FID
o-CRESOL		PSTIE2		ND[5.3E-03]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
3	0		ND	ND		
CROTONALDEHYDE		PSTIE2	2.8E-04 to 3.2E-04	2.8E-04	IMPINGER	DNPH METHOD
CUMENE		PSTIC		ND[5.7E-02]	HEATED CANISTER	FID
CUMENE		PSTIE1		ND[1.1E-02]	HEATED CANISTER	FID
CUMENE		PSTIE2		ND[5.3E-03]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
3	0		ND	ND		
1,2-DICHLOROETHANE		PSTMO1		ND[7.3E-05]	HEATED CANISTER	FID WITH CONCENTRATOR
1,2-DICHLOROETHANE		PSTMO2		ND[5.4E-05]	HEATED CANISTER	FID WITH CONCENTRATOR, U
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
2	0		ND	ND		
1,2-DICHLOROETHYLENE		PSTMO1		ND[5.3E-05]	HEATED CANISTER	FID WITH CONCENTRATOR
1,2-DICHLOROETHYLENE		PSTMO2		1.2E-04	HEATED CANISTER	FID WITH CONCENTRATOR, U
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
2	1		ND to 1.2E-04	6.0E-05		
DIMETHYL DISULFIDE		PSTMO1		8.2E-04	HEATED CANISTER	FID WITH CONCENTRATOR
DIMETHYL DISULFIDE		PSTMO2		1.1E-01	HEATED CANISTER	FID WITH CONCENTRATOR
DIMETHYL DISULFIDE		PSTIC		ND[4.1E-02]	HEATED CANISTER	FID
DIMETHYL DISULFIDE		PSTIE1	0.034 to 0.17	1.1E-01	HEATED CANISTER	FID
DIMETHYL DISULFIDE		PSTIE2	0.038 to 0.611	2.3E-01	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
5	4		ND to 0.611	1.1E-01		
DIMETHYL SULFIDE		PSTMO1		4.0E-04	HEATED CANISTER	FID WITH CONCENTRATOR
DIMETHYL SULFIDE		PSTMO2		6.7E-02	HEATED CANISTER	FID WITH CONCENTRATOR
DIMETHYL SULFIDE		PSTIC	0.64 to 0.71	6.7E-01	HEATED CANISTER	FID
DIMETHYL SULFIDE		PSTIE1	0.158 to 0.206	1.9E-01	HEATED CANISTER	FID
DIMETHYL SULFIDE		PSTIE2	0.395 to 0.629	5.1E-01	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
5	5		4.0E-04 to 0.629	1.9E-01		
ETHANOL		PSTIC	0.026 to 0.031	2.9E-02	HEATED CANISTER	FID
ETHANOL		PSTIE1	ND to 0.0067	4.9E-03	HEATED CANISTER	FID
ETHANOL		PSTIE2	0.012 to 0.013	1.2E-02	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
3	3		ND to 3.1E-02	1.2E-02		
ETHYL BENZENE		PSTIC		ND[9.4E-03]	HEATED CANISTER	FID
ETHYL BENZENE		PSTIE1		ND[6.3E-02]	HEATED CANISTER	FID
ETHYL BENZENE		PSTIE2		ND[5.3E-03]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
3	0		ND	ND		
FORMALDEHYDE		PSTMO1	ND[1.8E-04]	9.0E-05	IMPINGER	NCASI METHOD
FORMALDEHYDE		PSTMO2	ND[2.3E-04]	1.2E-04	IMPINGER	NCASI METHOD
FORMALDEHYDE		PSTIE2		9.2E-04	IMPINGER	DNPH
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
3	1		ND to 9.2E-04	1.2E-04		

TABLE 7 SUMMARY OF 'AIR TOXIC' EMISSIONS FROM KRAFT BLACK LIQUOR AND PULP STORAGE TANKS, CONTD.

SOURCE: HIGH DENSITY PULP STORAGE TANKS

VOLATILE ORGANIC COMPOUND		MILL CODE	EMISSIONS RANGE lb/hr/tank	EMISSIONS AVG lb/hr/tank	TEST METHOD	COMMENTS
n-HEXANE		PSTMO1	ND[1.8E-05]	8.0E-06	HEATED CANISTER	FID WITH CONCENTRATOR
n-HEXANE		PSTMO2		3.3E-04	HEATED CANISTER	FID WITH CONCENTRATOR
n-HEXANE		PSTIC	ND[4.1E-02]		HEATED CANISTER	FID
n-HEXANE		PSTIE1	ND[7.1E-03]		HEATED CANISTER	FID
n-HEXANE		PSTIE2	ND[3.5E-03]		HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
5	1		ND to 3.3E-04	1.7E-04		
HYDROGEN SULFIDE		PSTIE2	0.0366 to 0.0548	4.8E-02		FPD
METHANOL		PSTMO1		4.3E-02	HEATED CANISTER	FID WITH CONCENTRATOR
METHANOL		PSTMO2		2.4E-01	HEATED CANISTER	FID WITH CONCENTRATOR
METHANOL		PSTIC	0.083 to 0.134	1.2E-01	HEATED CANISTER	FID
METHANOL		PSTIE1	0.078 to 0.119	9.4E-02	HEATED CANISTER	FID
METHANOL		PSTIE2	0.63 to 0.82	7.4E-01	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
5	5		4.3E-02 to 0.82	1.2E-01		
METHYL ETHYL KETONE		PSTMO1		3.8E-04	HEATED CANISTER	FID WITH CONCENTRATOR
METHYL ETHYL KETONE		PSTMO2		5.9E-03	HEATED CANISTER	FID WITH CONCENTRATOR
METHYL ETHYL KETONE		PSTIC	ND[3.1E-02]	0.0155	HEATED CANISTER	FID
METHYL ETHYL KETONE		PSTIE1	ND[7.1E-03]	0.00355	HEATED CANISTER	FID
METHYL ETHYL KETONE		PSTIE2	0.015 to 0.017	1.6E-02	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
5	3		ND to 1.7E-02	5.9E-03		
METHYL ISOBUTYL KETONE		PSTMO1		3.7E-05	HEATED CANISTER	FID WITH CONCENTRATOR
METHYL ISOBUTYL KETONE		PSTMO2		1.2E-03	HEATED CANISTER	FID WITH CONCENTRATOR
METHYL ISOBUTYL KETONE		PSTIC	ND[4.7E-02]		HEATED CANISTER	FID WITH CONCENTRATOR
METHYL ISOBUTYL KETONE		PSTIE1	ND[7.1E-03]		HEATED CANISTER	FID
METHYL ISOBUTYL KETONE		PSTIE2	ND[5.3E-03]		HEATED CANISTER	6.0E-06 by DNPH METHOD
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
5	2		ND to 3.7E-05	6.2E-04		
METHYL MERCAPTAN		PSTMO1	ND[4.4E-04]	2.2E-04	HEATED CANISTER	FID WITH CONCENTRATOR
METHYL MERCAPTAN		PSTMO2	ND[3.2E-04]	1.6E-04	HEATED CANISTER	FID WITH CONCENTRATOR
METHYL MERCAPTAN		PSTIC	ND[2.1E-02]		HEATED CANISTER	FID
METHYL MERCAPTAN		PSTIE1	ND to 0.0044	3.7E-03	HEATED CANISTER	FID
METHYL MERCAPTAN		PSTIE2	ND[1.8E-03]	9.0E-04	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
5	1		ND to 4.4E-03	5.6E-04		
METHYLENE CHLORIDE		PSTMO1		ND[1.4E-04]	HEATED CANISTER	FID WITH CONCENTRATOR
METHYLENE CHLORIDE		PSTMO2		ND[9.8E-05]	HEATED CANISTER	FID WITH CONCENTRATOR
METHYLENE CHLORIDE		PSTIC		ND[4.2E-02]	HEATED CANISTER	FID
METHYLENE CHLORIDE		PSTIE1		ND[7.1E-03]	HEATED CANISTER	FID
METHYLENE CHLORIDE		PSTIE2		ND[3.5E-03]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
5	0		ND	ND		
PHENOL		PSTIC	0.13 to 0.19	1.5E-01	HEATED CANISTER	FID
PHENOL		PSTIE1	ND[8.6E-03]	4.3E-03	HEATED CANISTER	FID
PHENOL		PSTIE2	ND[5.3E-03]	2.7E-03	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
3	1		ND to 0.19	4.3E-03		
ALPHA-PINENE		PSTIC	6.9 to 8.7	7.9E+00	HEATED CANISTER	FID
ALPHA-PINENE		PSTIE1	0.108 to 0.256	1.7E-01	HEATED CANISTER	FID
ALPHA-PINENE		PSTIE2	ND[9.2E-03]	4.6E-03	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
3	2		ND to 8.7	1.7E-01		

TABLE 7 SUMMARY OF 'AIR TOXIC' EMISSIONS FROM KRAFT BLACK LIQUOR AND PULP STORAGE TANKS, CONTD.

SOURCE: HIGH DENSITY PULP STORAGE TANKS

VOLATILE ORGANIC COMPOUND		MILL CODE	EMISSIONS RANGE lb/hr/tank	EMISSIONS AVG lb/hr/tank	TEST METHOD	COMMENTS
BETA-PINENE		PSTIC	2.1 to 2.5	2.3E+00	HEATED CANISTER	FID
BETA-PINENE		PSTIE1	0.108 to 0.256	1.7E-01	HEATED CANISTER	FID
BETA-PINENE		PSTIE2	ND[9.2E-03]	4.6E-03	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
3	2		ND to 2.5	1.7E-01		
PROPIONALDEHYDE		PSTIE2	1.8E-03 to 2.3E-03	2.3E-03	IMPINGER	DNPH METHOD
STYRENE		PSTMO1		2.3E-05	HEATED CANISTER	FID WITH CONCENTRATOR
STYRENE		PSTMO2		5.1E-04	HEATED CANISTER	FID WITH CONCENTRATOR
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
2	2		2.3E-05 to 5.1E-04	2.7E-04		
TETRACHLOROETHYLENE		PSTMO1		9.3E-05	HEATED CANISTER	FID WITH CONCENTRATOR, U
TETRACHLOROETHYLENE		PSTMO2		ND[6.7E-05]	HEATED CANISTER	FID WITH CONCENTRATOR
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
2	1		ND to 9.3E-05	ND[3.5E-05]		
TOLUENE		PSTMO1		2.8E-05	HEATED CANISTER	FID WITH CONCENTRATOR
TOLUENE		PSTMO2		3.8E-04	HEATED CANISTER	FID WITH CONCENTRATOR
TOLUENE		PSTIC	ND[4.1E-02]		HEATED CANISTER	FID
TOLUENE		PSTIE1	ND[8.6E-03]		HEATED CANISTER	FID
TOLUENE		PSTIE2	ND[5.3E-03]		HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
5	2		ND to 3.8E-04	2.0E-04		
1,2,4-TRICHLOROBENZENE		PSTMO1		ND[3.3E-05]	HEATED CANISTER	FID WITH CONCENTRATOR, U
1,2,4-TRICHLOROBENZENE		PSTMO2		ND[2.4E-05]	HEATED CANISTER	FID WITH CONCENTRATOR, U
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
2	0		ND	ND		
1,1,1-TRICHLOROETHANE		PSTMO1		ND[7.4E-05]	HEATED CANISTER	FID WITH CONCENTRATOR, U
1,1,1-TRICHLOROETHANE		PSTMO2		ND[5.4E-05]	HEATED CANISTER	FID WITH CONCENTRATOR, U
1,1,1-TRICHLOROETHANE		PSTIC		ND[6.3E-02]	HEATED CANISTER	FID
1,1,1-TRICHLOROETHANE		PSTIE1		ND[1.1E-02]	HEATED CANISTER	FID
1,1,1-TRICHLOROETHANE		PSTIE2		ND[7.1E-03]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
5	0		ND	ND		
1,1,2-TRICHLOROETHANE		PSTMO1		9.7E-05	HEATED CANISTER	FID WITH CONCENTRATOR
1,1,2-TRICHLOROETHANE		PSTMO2	ND[5.4E-05]	2.7E-05	HEATED CANISTER	FID WITH CONCENTRATOR
1,1,2-TRICHLOROETHANE		PSTIC	ND[6.3E-02]		HEATED CANISTER	FID
1,1,2-TRICHLOROETHANE		PSTIE1	ND[1.1E-02]		HEATED CANISTER	FID
1,1,2-TRICHLOROETHANE		PSTIE2	ND[7.1E-03]		HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
5	1		ND to 9.7E-05	6.2E-05		
TRICHLOROETHYLENE		PSTMO1	ND[7.3E-05]	3.7E-05	HEATED CANISTER	FID WITH CONCENTRATOR, U
TRICHLOROETHYLENE		PSTMO2		8.5E-05	HEATED CANISTER	FID WITH CONCENTRATOR, U
TRICHLOROETHYLENE		PSTIC	ND[6.3E-02]		HEATED CANISTER	FID
TRICHLOROETHYLENE		PSTIE1	ND[1.1E-02]		HEATED CANISTER	FID
TRICHLOROETHYLENE		PSTIE2	ND[7.1E-03]		HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
5	1		ND to 8.5E-05	6.1E-05		
m,p-XYLENE		PSTMO1		2.1E-05	HEATED CANISTER	FID WITH CONCENTRATOR
m,p-XYLENE		PSTMO2		2.6E-05	HEATED CANISTER	FID WITH CONCENTRATOR
m,p-XYLENE		PSTIC	ND[4.7E-02]		HEATED CANISTER	FID
m,p-XYLENE		PSTIE1	ND[1.0E-02]		HEATED CANISTER	FID
m,p-XYLENE		PSTIE2	ND[5.3E-03]		HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
5	2		ND to 2.6E-05	2.4E-05		

TABLE 7 SUMMARY OF 'AIR TOXIC' EMISSIONS FROM KRAFT BLACK LIQUOR AND PULP STORAGE TANKS, CONTD.

SOURCE: HIGH DENSITY PULP STORAGE TANKS

VOLATILE ORGANIC COMPOUND		MILL CODE	EMISSIONS RANGE lb/hr/tank	EMISSIONS AVG lb/hr/tank	TEST METHOD	COMMENTS
o-XYLENE		PSTMO1		5.7E-05	HEATED CANISTER	FID WITH CONCENTRATOR
o-XYLENE		PSTMO2		3.7E-04	HEATED CANISTER	FID WITH CONCENTRATOR
o-XYLENE		PSTIC	ND[4.7E-02]		HEATED CANISTER	FID
o-XYLENE		PSTIE1	ND[1.0E-02]		HEATED CANISTER	FID
o-XYLENE		PSTIE2	ND[5.3E-03]		HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
5	2		ND to 3.7E-04	2.1E-04		
TERPENES		PSTMO1		1.4E-02	HEATED CANISTER	FID WITH CONCENTRATOR
TERPENES		PSTMO2		7.8E-01	HEATED CANISTER	FID WITH CONCENTRATOR
TERPENES		PSTIC	ND[9.4E-03]	4.7E-03	HEATED CANISTER	FID
TERPENES		PSTIE1	ND[1.3E-02]	6.5E-03	HEATED CANISTER	FID
TERPENES		PSTIE2	ND to 0.0589	3.8E-02	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
5	3		ND to 0.78	1.4E-02		
			lb C/hr/tank	lb C/hr/tank		
TOTAL HYDROCARBONS		PSTMO1	5.36 to 5.86	5.5E+00	M25A	
TOTAL HYDROCARBONS		PSTMO2		8.6E-01	M25A	
TOTAL HYDROCARBONS		PSTIC	0.016 to 0.021	1.8E-02	M25A	
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
3	3		0.016 to 5.86	8.6E-01		

MEDIAN - empirical median

TABLE 8 SUMMARY OF 'AIR TOXIC' EMISSIONS FROM PULP DECKERS

MILL CODE	TEST DATE	PULP TYPE	VENTS TESTED	NO. OF VENTS	SHOWER WATER	PROD. RATE ODTPD	REF.
DEME	1994	SW	HOOD & FILTRATE TANK	2	WHITE WATER	837 ODTPD	14
DEMF	1994	HW	HOOD VENT	1	CLEAN COND. & FRESH WATER	717 ODTPD	14
DEMM	1994	SW	HOOD VENT	1	FRESH WATER	406 ODTPD	14
DEIB	1993	HW	HOOD & FILTRATE TANK	2	NA	750 ADTPD	9
DEII	1993	SW	HOOD & SEAL PIT	2	NA	1050 ADTPD	9
DEIJ	1993	HW	HOOD VENT	1	NA	670 ADTPD	9

References

9. Individual Mill Testing for 'Air Toxics' - NCASI Mill File Information.
14. Volatile Organic Emissions from Pulp and Paper Mill Sources - Part III - Miscellaneous Sources at Kraft and TMP Mills, NCASI Technical Bulletin No. 677, Septeember 1994.

TABLE 8 SUMMARY OF 'AIR TOXIC' EMISSIONS FROM PULP DECKERS

VOLATILE ORGANIC COMPOUND		MILL CODE	EMISSIONS RANGE lb/ADTUBP	AVG lb/ADTUBP	TEST METHOD	COMMENTS
ACETALDEHYDE		DEME		1.1E-03	IMPINGER	NCASI METHOD
ACETALDEHYDE		DEMF		ND(4.8E-04)	HEATED CANISTER	FID
ACETALDEHYDE		DEMM		7.9E-05	HEATED CANISTER	FID
ACETALDEHYDE		DEIB		ND(1.7E-02)	HEATED CANISTER	FID, 2.1E-02 by DNPH
ACETALDEHYDE		DEII		1.4E-02	HEATED CANISTER	FID, 1.5E-02 by DNPH
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
5	3		ND to 1.4E-02	1.1E-03		
ACETONE		DEME		5.6E-03	HEATED CANISTER	FID
ACETONE		DEMF		8.6E-04	HEATED CANISTER	FID
ACETONE		DEMM		1.1E-02	HEATED CANISTER	FID
ACETONE		DEIB	0.024 to 0.028	2.6E-02	HEATED CANISTER	FID, 1.8E-02 by DNPH
ACETONE		DEII		1.1E-02	HEATED CANISTER	FID, 9.6E-03 by DNPH
ACETONE		DEIJ		ND(9.0E-04)	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
6	5		ND to 2.8E-02	8.1E-03		
ACETOPHENONE		DEIB		ND(2.3E-02)	HEATED CANISTER	FID, ND(1.9E-03) by DNPH
ACETOPHENONE		DEII		ND(8.3E-03)	HEATED CANISTER	FID, ND(6.0E-05) by DNPH
ACETOPHENONE		DEIJ		ND(1.9E-03)	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
3	0		ND	ND		
ACROLEIN		DEMF		ND(4.7E-04)	HEATED CANISTER	FID
ACROLEIN		DEMM		5.5E-04	HEATED CANISTER	FID, U
ACROLEIN		DEIB		ND(1.0E-02)	HEATED CANISTER	FID, ND(2.7E-03) by DNPH
ACROLEIN		DEII		ND(2.9E-03)	HEATED CANISTER	FID, ND(8.4E-05) by DNPH
ACROLEIN		DEIJ		ND(9.0E-04)	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN**		
5	1		ND to 5.5E-04	8.8E-05		
BENZALDEHYDE		DEIB		ND(3.4E-03)	RTI DRAFT	DNPH
BENZALDEHYDE		DEII	1.6E-04 to 1.0E-03	6.8E-04	RTI DRAFT	DNPH
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
2	1		ND to 1.0E-03	6.8E-04		
BENZENE		DEME		ND(2.4E-05)	HEATED CANISTER	FID
BENZENE		DEMF		ND(2.5E-05)	HEATED CANISTER	FID
BENZENE		DEMM		4.8E-05	HEATED CANISTER	FID
BENZENE		DEIB		ND(1.5E-02)	HEATED CANISTER	FID
BENZENE		DEII		ND(4.0E-03)	HEATED CANISTER	FID
BENZENE		DEIJ		ND(1.2E-03)	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN**		
6	1		ND to 4.6E-5	6.2E-06		
CARBON TETRACHLORIDE		DEME		2.6E-03	HEATED CANISTER	FID, U
CARBON TETRACHLORIDE		DEMF		ND(5.1E-03)	HEATED CANISTER	FID
CARBON TETRACHLORIDE		DEMM		8.3E-04	HEATED CANISTER	FID
CARBON TETRACHLORIDE		DEIB		ND(2.9E-02)	HEATED CANISTER	FID
CARBON TETRACHLORIDE		DEII		ND(8.0E-03)	HEATED CANISTER	FID
CARBON TETRACHLORIDE		DEIJ		ND(2.4E-03)	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN**		
6	2		ND to 2.6E-03	3.0E-04		
3-CARENE		DEII		ND(5.5E-04)	HEATED CANISTER	FID
CHLORINE		DEIJ		ND(2.0E-04)	NCASI METHOD	
CHLOROBENZENE		DEME		2.1E-04	HEATED CANISTER	FID, U
CHLOROBENZENE		DEMF		ND(3.1E-04)	HEATED CANISTER	FID
CHLOROBENZENE		DEMM		ND(6.6E-05)	HEATED CANISTER	FID

TABLE 8 SUMMARY OF 'AIR TOXIC' EMISSIONS FROM PULP DECKERS

VOLATILE ORGANIC COMPOUND		MILL CODE	EMISSIONS RANGE lb/ADTUBP	AVG lb/ADTUBP	TEST METHOD	COMMENTS
CHLOROBENZENE		DEIB		ND[2.0E-02]	HEATED CANISTER	FID
CHLOROBENZENE		DEII		ND[5.9E-03]	HEATED CANISTER	FID
CHLOROBENZENE		DEIJ		ND[1.8E-03]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN**		
6	1		ND to 2.1E-04	2.8E-05		
CHLOROFORM		DEME		ND[4.4E-04]	HEATED CANISTER	FID
CHLOROFORM		DEMF		ND[4.5E-03]	HEATED CANISTER	FID
CHLOROFORM		DEMM		ND[1.0E-03]	HEATED CANISTER	FID
CHLOROFORM		DEIB		ND[4.5E-02]	HEATED CANISTER	FID
CHLOROFORM		DEII		ND[1.2E-02]	HEATED CANISTER	FID
CHLOROFORM		DEIJ		ND[3.7E-03]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
6	0		ND	ND		
o-CRESOL		DEIB		ND[2.0E-02]	HEATED CANISTER	FID
o-CRESOL		DEII		2.0E-02	HEATED CANISTER	FID
o-CRESOL		DEIJ		ND[1.7E-03]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN**		
3	1		ND to 2.0E-02	5.1E-03		
m,p-CRESOL		DEIJ		ND[1.7E-03]	HEATED CANISTER	FID
CROTONALDEHYDE		DEIB		ND[2.3E-03]	HEATED CANISTER	FID
CROTONALDEHYDE		DEII	ND to 1.4E-04	8.7E-05	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
2	1		ND to 1.4E-04	8.7E-05		
CUMENE		DEIB		ND[2.3E-02]	HEATED CANISTER	FID
CUMENE		DEII		ND[6.3E-03]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS			MEDIAN		
2	0			ND		
1,2-DICHLOROETHANE		DEME		ND[1.2E-04]	HEATED CANISTER	FID
1,2-DICHLOROETHANE		DEMF		ND[1.1E-03]	HEATED CANISTER	FID
1,2-DICHLOROETHANE		DEMM		ND[2.3E-04]	HEATED CANISTER	FID
1,2-DICHLOROETHANE		DEIJ		ND[1.6E-03]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
4	0		ND	ND		
1,2-DICHLOROETHYLENE		DEME		8.6E-05	HEATED CANISTER	FID, U
1,2-DICHLOROETHYLENE		DEMF		ND[8.2E-04]	HEATED CANISTER	FID
1,2-DICHLOROETHYLENE		DEMM		ND[1.7E-04]	HEATED CANISTER	FID
1,2-DICHLOROETHYLENE		DEIB		ND[2.5E-02]	HEATED CANISTER	FID
1,2-DICHLOROETHYLENE		DEII		ND[6.9E-03]	HEATED CANISTER	FID
1,2-DICHLOROETHYLENE		DEIJ		ND[1.5E-03]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN**		
6	1		ND to 8.6E-05	1.2E-05		
DIMETHYL DISULFIDE		DEME		1.2E-02	HEATED CANISTER	FID
DIMETHYL DISULFIDE		DEMF		ND[1.3E-02]	HEATED CANISTER	FID
DIMETHYL DISULFIDE		DEMM		ND[2.7E-03]	HEATED CANISTER	FID
DIMETHYL DISULFIDE		DEIB	0.0112 to 0.0117	1.1E-02	HEATED CANISTER	FID
DIMETHYL DISULFIDE		DEII		3.4E-02	HEATED CANISTER	FID
DIMETHYL DISULFIDE		DEIJ	7.7E-03 to 1.1E-02	9.9E-03	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
6	4		ND to 1.2E-02	1.1E-02		
DIMETHYL SULFIDE		DEME		5.8E-02	HEATED CANISTER	FID
DIMETHYL SULFIDE		DEMF		ND[8.6E-03]	HEATED CANISTER	FID

TABLE 8 SUMMARY OF "AIR TOXIC" EMISSIONS FROM PULP DECKERS

VOLATILE ORGANIC COMPOUND		MILL CODE	EMISSIONS RANGE lb/ADTUBP	EMISSIONS AVG lb/ADTUBP	TEST METHOD	COMMENTS
DIMETHYL SULFIDE		DEMM		1.5E-02	HEATED CANISTER	FID
DIMETHYL SULFIDE		DEIB	8.1E-03 to 1.0E-02	9.7E-03	HEATED CANISTER	FID
DIMETHYL SULFIDE		DEII		4.4E-03	HEATED CANISTER	FID
DIMETHYL SULFIDE		DEIJ	1.1E-02 to 2.0E-02	1.6E-02	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
6	5		ND to 5.8E-02	1.3E-02		
ETHANOL		DEIB	2.0E-02 to 2.3E-02	2.2E-02	HEATED CANISTER	FID
ETHANOL		DEII		ND(2.4E-03)	HEATED CANISTER	FID
ETHANOL		DEIJ		ND(7.0E-04)	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN**		
3	1		ND to 2.3E-02	5.6E-03		
ETHYL BENZENE		DEIB		ND(2.0E-02)	HEATED CANISTER	FID
ETHYL BENZENE		DEII		ND(5.5E-03)	HEATED CANISTER	FID
ETHYL BENZENE		DEIJ		ND(1.7E-03)	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
3	0		ND	ND		
FORMALDEHYDE		DEMF		1.0E-02	HEATED CANISTER	FID
FORMALDEHYDE		DEMM		ND(3.4E-03)	HEATED CANISTER	FID
FORMALDEHYDE		DEIB		ND(2.4E-03)	RTI DRAFT	DNPH
FORMALDEHYDE		DEII	ND to 3.3E-04	1.4E-04	RTI DRAFT	DNPH
NO. OF TESTS	DETECTS		RANGE	MEDIAN**		
4	2		ND to 1.0E-02	8.7E-05		
n-HEXANE		DEIB		ND(5.0E-05)	HEATED CANISTER	FID
n-HEXANE		DEII		ND(4.5E-03)	HEATED CANISTER	FID
n-HEXANE		DEIJ		ND(1.4E-03)	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
3	0		ND	ND		
HEXACHLOROCYCLOPENTADIEI		DEIJ		ND(4.9E-03)	HEATED CANISTER	FID
HEXACHLOROETHANE		DEIJ		ND(3.7E-03)	HEATED CANISTER	FID
ISOPROPANOL		DEIB	ND to 6.2E-03	5.8E-03	HEATED CANISTER	FID
ISOPROPANOL		DEII		ND(3.1E-03)	HEATED CANISTER	FID
ISOPROPANOL		DEIJ		ND(9.0E-04)	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN**		
3	1		ND to 6.2E-03	1.5E-03		
METHANOL		DEME		6.1E-02	HEATED CANISTER	FID
METHANOL		DEMF		3.0E-02	HEATED CANISTER	FID
METHANOL		DEMM		2.2E-02	HEATED CANISTER	FID
METHANOL		DEIB	1.59 to 1.71	1.6E+00	HEATED CANISTER	FID
METHANOL		DEII		2.0E-01	HEATED CANISTER	FID
METHANOL		DEIJ	3.5E-02 to 4.7E-02	4.0E-02	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
6	6		2.2E-02 to 1.7E+00	5.1E-02		
METHYL ETHYL KETONE		DEME		4.9E-03	HEATED CANISTER	FID
METHYL ETHYL KETONE		DEMF		9.1E-04	HEATED CANISTER	FID
METHYL ETHYL KETONE		DEMM		3.5E-04	HEATED CANISTER	FID
METHYL ETHYL KETONE		DEIB	8.1E-03 to 8.4E-03	8.3E-03	HEATED CANISTER	FID
METHYL ETHYL KETONE		DEII		2.2E-03	HEATED CANISTER	FID, 2.9E-03 by DNPH
METHYL ETHYL KETONE		DEIJ		ND(1.1E-03)	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
6	5		ND to 8.4E-03	1.5E-03		

TABLE 8 SUMMARY OF 'AIR TOXIC' EMISSIONS FROM PULP DECKERS

VOLATILE ORGANIC COMPOUND		MILL CODE	EMISSIONS RANGE lb/ADTUBP	AVG lb/ADTUBP	TEST METHOD	COMMENTS
METHYL ISOBUTYL KETONE		DEME		ND[2.6E-05]	HEATED CANISTER	FID
METHYL ISOBUTYL KETONE		DEMF		ND[3.1E-04]	HEATED CANISTER	FID
METHYL ISOBUTYL KETONE		DEMM		2.2E-04	HEATED CANISTER	FID
METHYL ISOBUTYL KETONE		DEIB	ND to 1.0E-02	9.8E-03	HEATED CANISTER	FID
METHYL ISOBUTYL KETONE		DEII		ND[9.9E-05]	RTI DRAFT	DNPH
METHYL ISOBUTYL KETONE		DEIJ		ND[1.6E-03]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN**		
6	2		ND to 1.0E-2	8.0E-05		
METHYL MERCAPTAN		DEME		ND[7.3E-04]	HEATED CANISTER	FID
METHYL MERCAPTAN		DEMF		ND[6.7E-03]	HEATED CANISTER	FID
METHYL MERCAPTAN		DEMM		ND[1.4E-03]	HEATED CANISTER	FID
METHYL MERCAPTAN		DEIB		ND[9.1E-03]	HEATED CANISTER	FID
METHYL MERCAPTAN		DEII		7.6E-02	HEATED CANISTER	FID
METHYL MERCAPTAN		DEIJ		ND[8.0E-04]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN**		
6	1		ND to 7.6E-02	1.0E-02		
METHYLENE CHLORIDE		DEME		ND[2.2E-04]	HEATED CANISTER	FID
METHYLENE CHLORIDE		DEMF		ND[2.3E-03]	HEATED CANISTER	FID
METHYLENE CHLORIDE		DEMM		ND[5.0E-04]	HEATED CANISTER	FID
METHYLENE CHLORIDE		DEIB		ND[1.6E-02]	HEATED CANISTER	FID
METHYLENE CHLORIDE		DEII		ND[4.4E-03]	HEATED CANISTER	FID
METHYLENE CHLORIDE		DEIJ		ND[1.3E-03]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
6	0		ND	ND		
PHENOL		DEIB		ND[1.8E-02]	HEATED CANISTER	FID
PHENOL		DEII		ND[4.9E-03]	HEATED CANISTER	FID
PHENOL		DEIJ		ND[1.5E-03]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
3	0		ND	ND		
ALPHA-PINENE		DEME		3.9E-03	HEATED CANISTER	FID
ALPHA-PINENE		DEIJ	2.9E-03 to 4.4E-02	1.4E-02	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
2	2		2.9E-03 to 4.4E-02	8.8E-03		
BETA-PINENE		DEME		1.9E-02	HEATED CANISTER	FID
BETA-PINENE		DEIJ	ND to 1.9E-02	6.2E-03	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
2	2		ND to 1.9E-02	1.3E-02		
PROPIONALDEHYDE		DEIB	ND to 2.8E-03	1.9E-03	RTI DRAFT	DNPH
PROPIONALDEHYDE		DEII	1.3E-03 to 1.4E-03	1.4E-03	RTI DRAFT	DNPH
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
2	2		ND to 2.8E-03	1.6E-03		
STYRENE		DEME		2.3E-04	HEATED CANISTER	FID
STYRENE		DEMF		ND[2.9E-04]	HEATED CANISTER	FID
STYRENE		DEMM		4.5E-04	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
3	2		ND to 4.5E-04	2.3E-04		
ALPHA-TERINEOL		DEIJ		ND[2.4E-03]	HEATED CANISTER	FID
TETRACHLOROETHYLENE		DEME		4.1E-04	HEATED CANISTER	FID
TETRACHLOROETHYLENE		DEMF		ND[1.3E-03]	HEATED CANISTER	FID
TETRACHLOROETHYLENE		DEMM		7.9E-04	HEATED CANISTER	FID

TABLE 8 SUMMARY OF 'AIR TOXIC' EMISSIONS FROM PULP DECKERS

VOLATILE ORGANIC COMPOUND		MILL CODE	EMISSIONS RANGE lb/ADTUBP	AVG lb/ADTUBP	TEST METHOD	COMMENTS
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
3	2		ND to 7.8E-04	4.1E-04		
TOLUENE		DEME		1.5E-04	HEATED CANISTER	FID
TOLUENE		DEMF		ND(2.5E-04)	HEATED CANISTER	FID
TOLUENE		DEMM		2.1E-04	HEATED CANISTER	FID
TOLUENE		DEIB		ND(1.7E-02)	HEATED CANISTER	FID
TOLUENE		DEII		ND(4.8E-03)	HEATED CANISTER	FID
TOLUENE		DEIJ		ND(1.4E-04)	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN**		
6	2		ND to 2.1E-04	5.5E-05		
1,2,4-TRICHLOROBENZENE		DEME		2.2E-03	HEATED CANISTER	FID, U
1,2,4-TRICHLOROBENZENE		DEMF		1.0E-02	HEATED CANISTER	FID
1,2,4-TRICHLOROBENZENE		DEMM		ND(1.1E-04)	HEATED CANISTER	FID
1,2,4-TRICHLOROBENZENE		DEIJ		ND(2.8E-03)	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN**		
4	2		ND to 1.0E-02	1.4E-03		
1,1,1-TRICHLOROETHANE		DEME		ND(1.2E-04)	HEATED CANISTER	FID
1,1,1-TRICHLOROETHANE		DEMF		ND(1.1E-03)	HEATED CANISTER	FID
1,1,1-TRICHLOROETHANE		DEMM		ND(2.3E-04)	HEATED CANISTER	FID
1,1,1-TRICHLOROETHANE		DEIB		ND(2.5E-02)	HEATED CANISTER	FID
1,1,1-TRICHLOROETHANE		DEII		ND(7.0E-03)	HEATED CANISTER	FID
1,1,1-TRICHLOROETHANE		DEIJ		ND(4.2E-02)	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
6	0		ND	ND		
1,1,2-TRICHLOROETHANE		DEME		4.8E-04	HEATED CANISTER	FID, U
1,1,2-TRICHLOROETHANE		DEMF		ND(1.1E-03)	HEATED CANISTER	FID
1,1,2-TRICHLOROETHANE		DEMM		ND(2.3E-04)	HEATED CANISTER	FID
1,1,2-TRICHLOROETHANE		DEIB		ND(2.5E-02)	HEATED CANISTER	FID
1,1,2-TRICHLOROETHANE		DEII		ND(7.0E-03)	HEATED CANISTER	FID
1,1,2-TRICHLOROETHANE		DEIJ		ND(2.1E-03)	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN**		
6	1		ND to 4.8E-04	6.4E-05		
TRICHLOROETHYLENE		DEME		8.4E-04	HEATED CANISTER	FID
TRICHLOROETHYLENE		DEMF		ND(1.1E-03)	HEATED CANISTER	FID
TRICHLOROETHYLENE		DEMM		1.5E-03	HEATED CANISTER	FID, U
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
3	2		ND to 1.5E-03	8.4E-04		
m,p-XYLENE		DEME		1.1E-04	HEATED CANISTER	FID
m,p-XYLENE		DEMF		3.5E-04	HEATED CANISTER	FID
m,p-XYLENE		DEMM		1.6E-04	HEATED CANISTER	FID
m,p-XYLENE		DEIB		ND(2.0E-02)	HEATED CANISTER	FID
m,p-XYLENE		DEII		ND(5.5E-03)	HEATED CANISTER	FID
m,p-XYLENE		DEIJ		ND(1.7E-03)	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN**		
6	3		ND to 3.5E-04	8.5E-05		
o-XYLENE		DEME		1.5E-04	HEATED CANISTER	FID
o-XYLENE		DEMF		ND(3.0E-04)	HEATED CANISTER	FID
o-XYLENE		DEMM		2.3E-04	HEATED CANISTER	FID
o-XYLENE		DEIB		ND(2.0E-02)	HEATED CANISTER	FID
o-XYLENE		DEII		ND(5.5E-03)	HEATED CANISTER	FID
o-XYLENE		DEIJ		ND(1.7E-03)	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN**		
6	2		ND to 2.3E-04	5.5E-05		

TABLE 8 SUMMARY OF 'AIR TOXIC' EMISSIONS FROM PULP DECKERS

VOLATILE ORGANIC COMPOUND		MILL CODE	EMISSIONS RANGE lb/ADTUBP	AVG lb/ADTUBP	TEST METHOD	COMMENTS
TERPENES		DEMF		1.5E-02	HEATED CANISTER	FID
TERPENES		DEMM		1.0E-01	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
2	2		1.5E-02 to 1.0E-01	5.8E-02		
			lb C/ADTUBP	lb C/ADTUBP		
TOTAL HYDROCARBONS		DEMF		5.1E-02	M25A	
TOTAL HYDROCARBONS		DEMM		9.0E-02	M25A	
TOTAL HYDROCARBONS		DEIB	7.3E-02 to 8.2E-02	7.7E-02	M25A	
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
3	3		5.0E-02 to 9.0E-02	7.7E-02		

Notes
(a) U - unidentified and unconfirmed by GC/MS
(b) For DECKER units with codes DEMX (X = A to Q) the heated canister gases were concentrated before analysis on the FID;
(c) For DECKER units with codes DEIX (X = A to J) the heated canister gases were not concentrated before analysis on the FID;

MEDIAN - empirical median; MEDIAN* - "NORPLOT" median; MEDIAN** - "SDln" median

TABLE 9 SUMMARY OF 'AIR TOXIC' EMISSIONS FROM KRAFT NCG THERMAL OXIDIZERS

MILL CODE	TEST DATE	SOURCE DESCRIPTION	PULP TYPE	OTHER INFORMATION	CAPACITY DAY	REF.
NCGTOME	1994	NCG THERMAL OXIDIZER SCRUBBER STACK	SW/HW	PROPANE-FIRED	1715 ADTUBPD	14
NCGTOMG	1994	NCG THERMAL OXIDIZER OUTLET STACK	SW/HW/SC	NAT GAS-FIRED	2950 ADTUBPD	14
NCGTOMM	1994	NCG THERMAL OXIDIZER OUTLET STACK	SW/HW	NAT GAS-FIRED	1022 ADTUBPD	14
NCGTOMN	1994	NCG THERMAL OXIDIZER OUTLET STACK	SW		1202 ADTUBPD	14
NCGTOIC	1993	NCG THERMAL OXIDIZER OUTLET STACK	SW		2028 ADTUBPD	9

Notes
SC - SEMI-CHEMICAL PULPING

References

9. Individual Mill Testing for 'Air Toxics' - NCASI Mill File Information.
14. Volatile Organic Emissions from Pulp and Paper Mill Sources - Part III - Miscellaneous Sources at Kraft and TMP Mills, NCASI Technical Bulletin No. 677, Septeember 1994.

TABLE 9 SUMMARY OF 'AIR TOXIC' EMISSIONS FROM KRAFT NCG THERMAL OXIDIZERS, CONTD.

SOURCE: NCG THERMAL OXIDIZERS

VOLATILE ORGANIC COMPOUND		MILL CODE	AVERAGE EMISSIONS RANGE lb/ADTUBP	AVG lb/ADTUBP	TEST METHOD	COMMENTS
ACETALDEHYDE		NCGTOME		ND[7.1E-04]	NMIT	NCASI IMPINGER METHOD
ACETALDEHYDE		NCGTOMG		1.7E-05	HEATED CANISTER	FID
ACETALDEHYDE		NCGTOMM		1.3E-04	HEATED CANISTER	FID
ACETALDEHYDE		NCGTOMN		4.0E-03	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
4	3		ND to 4.0E-03	7.2E-05		
ACETONE		NCGTOME		4.2E-04	HEATED CANISTER	FID
ACETONE		NCGTOMG		1.0E-05	HEATED CANISTER	FID
ACETONE		NCGTOMM		1.5E-04	HEATED CANISTER	FID
ACETONE		NCGTOMN		2.5E-03	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
4	3		1.0E-05 to 2.5E-03	2.9E-04		
ACETOPHENONE		NCGTOIC		ND1.4E-03]	HEATED CANISTER	FID
ACROLEIN		NCGTOMG		ND[4.9E-06]	HEATED CANISTER	FID
ACROLEIN		NCGTOMM		ND[4.5E-06]	HEATED CANISTER	FID
ACROLEIN		NCGTOMN		ND[1.6E-04]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
3	0		ND	ND		
BENZENE		NCGTOME		1.0E-03	HEATED CANISTER	FID
BENZENE		NCGTOMG		ND[2.2E-06]	HEATED CANISTER	FID
BENZENE		NCGTOMM		3.0E-04	HEATED CANISTER	FID
BENZENE		NCGTOMN		1.5E-04	HEATED CANISTER	FID
BENZENE		NCGTOIC		ND[9.0E-04]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
5	3		ND to 1.0E-03	1.5E-04		
CARBON DISULFIDE		NCGTOIC		ND[4.0E-04]	HEATED CANISTER	FLAME PHOTOMETER
CARBON TETRACHLORIDE		NCGTOME		3.6E-03	HEATED CANISTER	FID, U
CARBON TETRACHLORIDE		NCGTOMG		ND[5.3E-05]	HEATED CANISTER	FID
CARBON TETRACHLORIDE		NCGTOMM		ND[5.0E-04]	HEATED CANISTER	FID
CARBON TETRACHLORIDE		NCGTOMN		ND[1.8E-03]	HEATED CANISTER	FID
CARBON TETRACHLORIDE		NCGTOIC		ND[1.8E-03]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN**		
5	1		ND to 3.6E-03	5.1E-04		
CARBONYL SULFIDE		NCGTOIC		ND[3.0E-04]	HEATED CANISTER	FLAME PHOTOMETER
CHLOROBENZENE		NCGTOME		ND[3.2E-05]	HEATED CANISTER	FID
CHLOROBENZENE		NCGTOMG		ND[3.2E-06]	HEATED CANISTER	FID
CHLOROBENZENE		NCGTOMM		ND[3.0E-05]	HEATED CANISTER	FID
CHLOROBENZENE		NCGTOMN		ND[1.2E-04]	HEATED CANISTER	FID
CHLOROBENZENE		NCGTOIC		ND[1.3E-03]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
5	0		ND	ND		
CHLOROFORM		NCGTOME		ND[3.0E-04]	HEATED CANISTER	FID
CHLOROFORM		NCGTOMG		ND[3.0E-05]	HEATED CANISTER	FID
CHLOROFORM		NCGTOMM		ND[2.7E-04]	HEATED CANISTER	FID
CHLOROFORM		NCGTOMN		ND[1.0E-03]	HEATED CANISTER	FID
CHLOROFORM		NCGTOIC		ND[2.8E-03]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
5	0		ND	ND		
o-CRESOL		NCGTOIC		ND[1.3E-03]	HEATED CANISTER	FID
CUMENE		NCGTOIC		ND[1.4E-03]	HEATED CANISTER	FID
1,2-DICHLOROETHANE		NCGTOME		ND[1.2E-04]	HEATED CANISTER	FID

TABLE 9 SUMMARY OF 'AIR TOXIC' EMISSIONS FROM KRAFT NCG THERMAL OXIDIZERS, CONTD.

SOURCE: NCG THERMAL OXIDIZERS

VOLATILE ORGANIC COMPOUND		MILL CODE	AVERAGE EMISSIONS RANGE lb/ADTUBP	AVG lb/ADTUBP	TEST METHOD	COMMENTS
1,2-DICHLOROETHANE		NCGTOMG		ND[1.2E-06]	HEATED CANISTER	FID
1,2-DICHLOROETHANE		NCGTOMM		ND[1.1E-04]	HEATED CANISTER	FID
1,2-DICHLOROETHANE		NCGTOMN		ND[3.8E-04]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
4	0		ND	ND		
1,2-DICHLOROETHYLENE		NCGTOME		2.1E-04	HEATED CANISTER	FID, U
1,2-DICHLOROETHYLENE		NCGTOMG		9.1E-06	HEATED CANISTER	FID, U
1,2-DICHLOROETHYLENE		NCGTOMM		8.2E-04	HEATED CANISTER	FID, U
1,2-DICHLOROETHYLENE		NCGTOMN		ND[2.8E-04]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
4	3		ND to 8.2E-04	1.1E-04		
DIMETHYL DISULFIDE		NCGTOME		ND[1.3E-03]	HEATED CANISTER	FID
DIMETHYL DISULFIDE		NCGTOMG		ND[1.3E-04]	HEATED CANISTER	FID
DIMETHYL DISULFIDE		NCGTOMM		ND[1.3E-03]	HEATED CANISTER	FID
DIMETHYL DISULFIDE		NCGTOMN		ND[4.5E-03]	HEATED CANISTER	FID
DIMETHYL DISULFIDE		NCGTOIC		ND[1.1E-03]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
5	0		ND	ND		
DIMETHYL SULFIDE		NCGTOME		ND[9.0E-04]	HEATED CANISTER	FID
DIMETHYL SULFIDE		NCGTOMG		ND[8.9E-05]	HEATED CANISTER	FID
DIMETHYL SULFIDE		NCGTOMM		ND[8.3E-04]	HEATED CANISTER	FID
DIMETHYL SULFIDE		NCGTOMN		ND[3.0E-03]	HEATED CANISTER	FID
DIMETHYL SULFIDE		NCGTOIC		ND[7.0E-04]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
5	0		ND	ND		
ETHANOL		NCGTOIC		ND[5.0E-04]	HEATED CANISTER	FID
FORMALDEHYDE		NCGTOME		ND[2.6E-05]	NMIT	NCASI IMPINGER METHOD
FORMALDEHYDE		NCGTOMG		1.5E-04	NMIT	NCASI IMPINGER METHOD
FORMALDEHYDE		NCGTOMM		5.4E-03	NMIT	NCASI IMPINGER METHOD
FORMALDEHYDE		NCGTOMN		ND[5.1E-04]	NMIT	NCASI IMPINGER METHOD
NO. OF TESTS	DETECTS		RANGE	MEDIAN**		
4	2		ND to 5.4E-03	7.0E-05		
n-HEXANE		NCGTOMG		ND[2.5E-06]	HEATED CANISTER	FID
n-HEXANE		NCGTOMM		6.1E-05	HEATED CANISTER	FID
n-HEXANE		NCGTOMN		1.1E-04	HEATED CANISTER	FID
n-HEXANE		NCGTOIC		ND[1.0E-03]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN**		
4	2		ND to 1.1E-04	2.8E-05		
HYDROGEN SULFIDE		NCGTOIC		ND[2.0E-04]	HEATED CANISTER	FLAME PHOTOMETER
METHANOL		NCGTOME		1.0E-02	HEATED CANISTER	FID
METHANOL		NCGTOMG		7.3E-06	HEATED CANISTER	FID
METHANOL		NCGTOMM		1.3E-03	HEATED CANISTER	FID
METHANOL		NCGTOMN		5.6E-03	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
4	4		7.3E-06 to 1.0E-02	3.5E-03		
METHYL ETHYL KETONE		NCGTOME		9.1E-05	HEATED CANISTER	FID
METHYL ETHYL KETONE		NCGTOMG		ND[8.3E-06]	HEATED CANISTER	FID
METHYL ETHYL KETONE		NCGTOMM		7.7E-05	HEATED CANISTER	FID
METHYL ETHYL KETONE		NCGTOMN		3.8E-04	HEATED CANISTER	FID
METHYL ETHYL KETONE		NCGTOIC		ND[8.0E-04]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
5	3		ND to 3.8E-04	7.7E-05		

TABLE 9 SUMMARY OF 'AIR TOXIC' EMISSIONS FROM KRAFT NCG THERMAL OXIDIZERS, CONTD.

SOURCE: NCG THERMAL OXIDIZERS

VOLATILE ORGANIC COMPOUND	MILL CODE	AVERAGE EMISSIONS RANGE lb/ADTUBP	AVG lb/ADTUBP	TEST METHOD	COMMENTS
METHYL ISOBUTYL KETONE	NCGTOME		ND[2.2E-05]	HEATED CANISTER	FID
METHYL ISOBUTYL KETONE	NCGTOMG		ND[2.2E-06]	HEATED CANISTER	FID
METHYL ISOBUTYL KETONE	NCGTOMM		ND[2.1E-05]	HEATED CANISTER	FID
METHYL ISOBUTYL KETONE	NCGTOMN		ND[7.6E-05]	HEATED CANISTER	FID
METHYL ISOBUTYL KETONE	NCGTOIC		ND[1.2E-03]	HEATED CANISTER	FID
NO. OF TESTS / DETECTS		RANGE	MEDIAN		
5 / 0		ND	ND		
HEXACHLOROCYCLOPENTADIE	NCGTOIC		ND3.2E-03]	HEATED CANISTER	FID
HEXACHLOROETHANE	NCGTOIC		ND[2.7E-03]	HEATED CANISTER	FID
METHYL MERCAPTAN	NCGTOME		ND[7.0E-04]	HEATED CANISTER	FID
METHYL MERCAPTAN	NCGTOMG		6.5E-05	HEATED CANISTER	FID
METHYL MERCAPTAN	NCGTOMM		ND[6.4E-04]	HEATED CANISTER	FID
METHYL MERCAPTAN	NCGTOMN		ND[2.3E-03]	HEATED CANISTER	FID
METHYL MERCAPTAN	NCGTOIC		ND[6.0E-04]	HEATED CANISTER	FID
NO. OF TESTS / DETECTS		RANGE	MEDIAN**		
5 / 1		ND to 6.5E-05	3.1E-06		
METHYLENE CHLORIDE	NCGTOME		ND[1.8E-04]	HEATED CANISTER	FID
METHYLENE CHLORIDE	NCGTOMG		ND[1.8E-05]	HEATED CANISTER	FID
METHYLENE CHLORIDE	NCGTOMM		ND[1.6E-04]	HEATED CANISTER	FID
METHYLENE CHLORIDE	NCGTOMN		ND[6.0E-04]	HEATED CANISTER	FID
METHYLENE CHLORIDE	NCGTOIC		ND[1.0E-03]	HEATED CANISTER	FID
NO. OF TESTS / DETECTS		RANGE	MEDIAN		
5 / 0		ND	ND		
PHENOL	NCGTOIC		ND[1.1E-03]	HEATED CANISTER	FID
STYRENE	NCGTOME		6.1E-05	HEATED CANISTER	FID
STYRENE	NCGTOMG		ND[3.0E-06]	HEATED CANISTER	FID
STYRENE	NCGTOMM		ND[2.8E-05]	HEATED CANISTER	FID
STYRENE	NCGTOMN		ND[1.0E-04]	HEATED CANISTER	FID
NO. OF TESTS / DETECTS		RANGE	MEDIAN**		
4 / 1		ND to 6.1E-05	4.1E-06		
TETRACHLOROETHYLENE	NCGTOME		ND[1.4E-04]	HEATED CANISTER	FID
TETRACHLOROETHYLENE	NCGTOMG		ND[1.4E-05]	HEATED CANISTER	FID
TETRACHLOROETHYLENE	NCGTOMM		ND[1.3E-04]	HEATED CANISTER	FID
TETRACHLOROETHYLENE	NCGTOMN		ND[4.8E-04]	HEATED CANISTER	FID
NO. OF TESTS / DETECTS		RANGE	MEDIAN		
4 / 0		ND	ND		
TOLUENE	NCGTOME		ND[2.7E-05]	HEATED CANISTER	FID
TOLUENE	NCGTOMG		ND[2.6E-06]	HEATED CANISTER	FID
TOLUENE	NCGTOMM		ND[2.4E-05]	HEATED CANISTER	FID
TOLUENE	NCGTOMN		ND[8.8E-05]	HEATED CANISTER	FID
TOLUENE	NCGTOIC		ND[1.1E-03]	HEATED CANISTER	FID
NO. OF TESTS / DETECTS		RANGE	MEDIAN		
5 / 0		ND	ND		
1,2,4-TRICHLOROBENZENE	NCGTOME		ND[5.2E-05]	HEATED CANISTER	FID
1,2,4-TRICHLOROBENZENE	NCGTOMG		ND[5.2E-06]	HEATED CANISTER	FID
1,2,4-TRICHLOROBENZENE	NCGTOMM		7.9E-04	HEATED CANISTER	FID
1,2,4-TRICHLOROBENZENE	NCGTOMN		ND[1.7E-04]	HEATED CANISTER	FID
NO. OF TESTS / DETECTS		RANGE	MEDIAN**		
4 / 1		ND to 7.9E-04	5.3E-05		
1,1,1-TRICHLOROETHANE	NCGTOME		ND[1.2E-04]	HEATED CANISTER	FID
1,1,1-TRICHLOROETHANE	NCGTOMG		ND[1.2E-05]	HEATED CANISTER	FID
1,1,1-TRICHLOROETHANE	NCGTOMM		ND[1.1E-04]	HEATED CANISTER	FID
1,1,1-TRICHLOROETHANE	NCGTOMN		ND[3.9E-04]	HEATED CANISTER	FID

TABLE 9 SUMMARY OF 'AIR TOXIC' EMISSIONS FROM KRAFT NCG THERMAL OXIDIZERS, CONTD.

SOURCE: NCG THERMAL OXIDIZERS

VOLATILE ORGANIC COMPOUND		MILL CODE	AVERAGE EMISSIONS RANGE lb/ADTUBP	AVG lb/ADTUBP	TEST METHOD	COMMENTS
1,1,1-TRICHLOROETHANE		NCGTOIC		ND[1.8E-03]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
5	0		ND	ND		
1,1,2-TRICHLOROETHANE		NCGTOME		ND[1.4E-06]	HEATED CANISTER	FID
1,1,2-TRICHLOROETHANE		NCGTOMG		ND[1.4E-06]	HEATED CANISTER	FID
1,1,2-TRICHLOROETHANE		NCGTOMM		ND[1.1E-04]	HEATED CANISTER	FID
1,1,2-TRICHLOROETHANE		NCGTOMN		ND[3.9E-04]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
4	0		ND	ND		
TRICHLOROETHYLENE		NCGTOME		ND[1.2E-04]	HEATED CANISTER	FID
TRICHLOROETHYLENE		NCGTOMG		ND[1.2E-05]	HEATED CANISTER	FID
TRICHLOROETHYLENE		NCGTOMM		ND[1.1E-04]	HEATED CANISTER	FID
TRICHLOROETHYLENE		NCGTOMN		ND[3.9E-04]	HEATED CANISTER	FID
TRICHLOROETHYLENE		NCGTOIC		ND[1.5E-03]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
5	0		ND	ND		
m,p-XYLENE		NCGTOME		ND[3.1E-06]	HEATED CANISTER	FID
m,p-XYLENE		NCGTOMG		ND[3.1E-06]	HEATED CANISTER	FID
m,p-XYLENE		NCGTOMM		7.8E-06	HEATED CANISTER	FID
m,p-XYLENE		NCGTOMN		2.3E-04	HEATED CANISTER	FID
m,p-XYLENE		NCGTOIC		ND[1.2E-03]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN**		
5	2		ND to 2.3E-04	2.2E-06		
o-XYLENE		NCGTOME		4.1E-06	HEATED CANISTER	FID
o-XYLENE		NCGTOMG		ND[3.1E-06]	HEATED CANISTER	FID
o-XYLENE		NCGTOMM		ND[2.8E-06]	HEATED CANISTER	FID
o-XYLENE		NCGTOMN		3.1E-04	HEATED CANISTER	FID
o-XYLENE		NCGTOIC		ND[1.2E-03]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN**		
5	2		ND to 3.1E-04	1.2E-05		
ALPHA-PINENE		NCGTOME		ND[4.0E-06]	HEATED CANISTER	FID
ALPHA-PINENE		NCGTOIC		ND[1.6E-03]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
2	0		ND	ND		
BETA-PINENE		NCGTOME		7.0E-06	HEATED CANISTER	FID
BETA-PINENE		NCGTOIC		ND[1.6E-03]	HEATED CANISTER	FID
NO. OF TESTS	DETECTS			MEDIAN		
2	1			7.0E-05		
TERPENES		NCGTOMG		8.7E-04	HEATED CANISTER	FID
TERPENES		NCGTOMM		4.3E-02	HEATED CANISTER	FID
TERPENES		NCGTOMN		2.5E-02	HEATED CANISTER	FID
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
3	3		8.7E-04 to 4.3E-02	2.5E-02		
			lb C/ADTUBP	lb C/ADTUBP		
TOTAL HYDROCARBONS		NCGTOMG		2.9E-03	M25A	
TOTAL HYDROCARBONS		NCGTOMM		2.7E-02	M25A	
TOTAL HYDROCARBONS		NCGTOMN		1.9E-02	M25A	
TOTAL HYDROCARBONS		NCGTOIC	14.9 to 29.8 ppm	2.7E-03	M25A	
NO. OF TESTS	DETECTS		RANGE	MEDIAN		
4	4		2.7E-03 to 2.7E-02	1.1E-02		

MEDIAN - empirical median; MEDIAN* - "NORPLOT" median; MEDIAN** - "SDln" median

TABLE 9 SUMMARY OF 'AIR TOXIC' EMISSIONS FROM KRAFT NCG THERMAL OXIDIZERS, CONTD.

SOURCE: NCG THERMAL OXIDIZERS

VOLATILE ORGANIC COMPOUND	MILL CODE	AVERAGE EMISSIONS RANGE lb/ADTUBP	AVERAGE EMISSIONS AVG lb/ADTUBP	TEST METHOD	COMMENTS
CARBON MONOXIDE	NCGTOIC	0.5 to 1.4 ppm	3.1E-06		
OXYGEN	NCGTOIC	16.6 to 16.9%			
NITROGEN DIOXIDE	NCGTOIC	439 to 547 ppm	2.5E-01		
SULFUR DIOXIDE	NCGTOIC	355 to 447 ppm	2.5E-01		

Notes
U - unidentified and unconfirmed by GC/MS

TABLE 10 SUMMARY OF 'AIR TOXIC' EMISSIONS FROM MISCELLANEOUS SULFITE PULPING SOURCES

MILL CODE	SOURCE DESCRIPTION	SULFITE PULPING	OTHER INFORMATION	TEST DATE	ODTP/ DAY	WOOD TYPE	REF.
RSWMI	RED STOCK WASHER	Mg-based	Includes VDWs, KNOTTERS & FILTR. TANK (c)	1994	609 ODTPD	HW	19
RSWMP	RED STOCK WASHER	NH3-based	VDWs & FILTR. TANK	1994	702 ODTPD	SW	19
NSMI	NUISANCE SCRUBBER	Mg-based	Used fresh water in scrubber	1994	489 ODTPD	HW	19
NSMP	NUISANCE SCRUBBER	NH3-based	Used sodium bisulfite in scrubber	1994	714 ODTPD	SW	19
SBPMI	4-STAGE BLEACH PLANT (a)	Mg-based	Uses ClO2, Caustic, H2O2 & O2 after O2 delig.	1994	518 ODTPD	HW	19
CDEVMP	COMB. DIGESTER EVAC. VENT	NH3-based	Batch Digesters, 5985 DSCFM	1994	142 TC/S (b)	SW	19
CBPVMP	COMBINED BLOW PIT VENT	NH3-based	Batch Digesters, 10,000 DSCFM	1994	664 ODTPD	SW	19

Notes
(a) Includes the 'Green Stack,' 3 Washer Hoods, 2 Seal Tank Vents, E Reactor Tank Vent & O2 Blow Tank Vent;
(b) TC/S - tons wet chips charged per sec;
(c) Three of four filtrate tanks vents were not tested. These three vents go to the nuisance scrubber.

References
19. Volatile Organic Emissions from Pulp and Paper Mill Sources - Part VIII - Sulfite Mills, NCASI Technical Bulletin No. 682, November 1994.

TABLE 10 SUMMARY OF 'AIR TOXIC' EMISSIONS FROM MISCELLANEOUS SULFITE PULPING SOURCES, CONTD.

SOURCE: REDSTOCK WASHING SOURCES

VOLATILE ORGANIC COMPOUND		MILL CODE	AVG EMISSIONS lb/ODTP	TEST METHOD	COMMENTS
ACETALDEHYDE		RSWMI	8.8E-03	HEATED CANISTER	FID WITH CONCENTRATOR
ACETALDEHYDE		RSWMP	1.1E-03	HEATED CANISTER	FID WITH CONCENTRATOR
NO. TESTED	DETECTS		MEDIAN		
2	2		4.9E-03		
ACETONE		RSWMI	2.1E-03	HEATED CANISTER	FID WITH CONCENTRATOR
ACETONE		RSWMP	6.2E-03	HEATED CANISTER	FID WITH CONCENTRATOR
NO. TESTED	DETECTS		MEDIAN		
2	2		4.2E-03		
ACROLEIN		RSWMI	ND[5.9E-04]	HEATED CANISTER	FID WITH CONCENTRATOR
ACROLEIN		RSWMP	ND[3.0E-04]	HEATED CANISTER	FID WITH CONCENTRATOR
NO. TESTED	DETECTS		MEDIAN		
2	0		ND		
BENZENE		RSWMI	ND[2.8E-04]	HEATED CANISTER	FID WITH CONCENTRATOR
BENZENE		RSWMP	ND[1.4E-04]	HEATED CANISTER	FID WITH CONCENTRATOR
NO. TESTED	DETECTS		MEDIAN		
2	0		ND		
CARBON TETRACHLORIDE		RSWMI	ND[6.5E-03]	HEATED CANISTER	FID WITH CONCENTRATOR
CARBON TETRACHLORIDE		RSWMP	ND[3.3E-03]	HEATED CANISTER	FID WITH CONCENTRATOR
NO. TESTED	DETECTS		MEDIAN		
2	0		ND		
CHLOROBENZENE		RSWMI	ND[3.9E-04]	HEATED CANISTER	FID WITH CONCENTRATOR, U
CHLOROBENZENE		RSWMP	ND[2.0E-04]	HEATED CANISTER	FID WITH CONCENTRATOR, U
NO. TESTED	DETECTS		MEDIAN		
2	0		ND		
CHLOROFORM		RSWMI	ND[5.0E-03]	HEATED CANISTER	FID WITH CONCENTRATOR
CHLOROFORM		RSWMP	ND[2.5E-03]	HEATED CANISTER	FID WITH CONCENTRATOR
NO. TESTED	DETECTS		MEDIAN		
2	0		ND		
DIMETHYL DISULFIDE		RSWMI	ND[1.6E-02]	HEATED CANISTER	FID WITH CONCENTRATOR
DIMETHYL DISULFIDE		RSWMP	ND[8.3E-03]	HEATED CANISTER	FID WITH CONCENTRATOR
NO. TESTED	DETECTS		MEDIAN		
2	0		ND		
1,2-DICHLOROETHANE		RSWMI	ND[1.4E-03]	HEATED CANISTER	FID WITH CONCENTRATOR
1,2-DICHLOROETHANE		RSWMP	6.0E-04	HEATED CANISTER	FID WITH CONCENTRATOR
NO. TESTED	DETECTS		MEDIAN		
2	1		6.0E-04		

TABLE 10 SUMMARY OF 'AIR TOXIC' EMISSIONS FROM MISCELLANEOUS SULFITE PULPING SOURCES, CONTD.

SOURCE: REDSTOCK WASHING SOURCES

VOLATILE ORGANIC COMPOUND		MILL CODE	AVG EMISSIONS lb/ODTP	TEST METHOD	COMMENTS
1,2-DICHLOROETHYLENE		RSWMI	ND[1.0E-03]	HEATED CANISTER	FID WITH CONCENTRATOR
1,2-DICHLOROETHYLENE		RSWMP	ND[5.2E-04]	HEATED CANISTER	FID WITH CONCENTRATOR
NO. TESTED	DETECTS		MEDIAN		
2	0		ND		
DIMETHYL SULFIDE		RSWMI	ND[1.1E-02]	HEATED CANISTER	FID WITH CONCENTRATOR
DIMETHYL SULFIDE		RSWMP	ND[5.5E-03]	HEATED CANISTER	FID WITH CONCENTRATOR
NO. TESTED	DETECTS		MEDIAN		
2	0		ND		
FORMALDEHYDE		RSWMI	1.4E-02	NMIT	NCASI IMPINGER METHOD
FORMALDEHYDE		RSWMP	ND[4.9E-04]	NMIT	NCASI IMPINGER METHOD
NO. TESTED	DETECTS		MEDIAN		
2	1		7.2E-03		
n-HEXANE		RSWMP	6.0E-04	HEATED CANISTER	FID WITH CONCENTRATOR
METHANOL		RSWMI	2.2E-01	HEATED CANISTER	FID WITH CONCENTRATOR
METHANOL		RSWMP	4.3E-01	HEATED CANISTER	FID WITH CONCENTRATOR
NO. TESTED	DETECTS		MEDIAN		
2	2		3.3E-01		
METHYL ETHYL KETONE		RSWMI	ND[2.0E-02]	NMIT	NCASI IMPINGER METHOD
METHYL ETHYL KETONE		RSWMP	9.3E-04	HEATED CANISTER	FID WITH CONCENTRATOR
NO. TESTED	DETECTS		MEDIAN		
2	1		9.3E-04		
METHYL ISOBUTYL KETONE		RSWMP	ND[1.6E-04]	HEATED CANISTER	FID WITH CONCENTRATOR
METHYL MERCAPTAN		RSWMI	ND[8.5E-03]	HEATED CANISTER	FID WITH CONCENTRATOR
METHYL MERCAPTAN		RSWMP	ND[4.3E-03]	HEATED CANISTER	FID WITH CONCENTRATOR
NO. TESTED	DETECTS		MEDIAN		
2	0		ND		
METHYLENE CHLORIDE		RSWMI	ND[2.6E-03]	HEATED CANISTER	FID WITH CONCENTRATOR
METHYLENE CHLORIDE		RSWMP	ND[1.3E-03]	HEATED CANISTER	FID WITH CONCENTRATOR
NO. TESTED	DETECTS		MEDIAN		
2	0		ND		
STYRENE		RSWMI	ND[3.6E-04]	HEATED CANISTER	FID WITH CONCENTRATOR
STYRENE		RSWMP	ND[1.8E-04]	HEATED CANISTER	FID WITH CONCENTRATOR
NO. TESTED	DETECTS		MEDIAN		
2	0		ND		

TABLE 10 SUMMARY OF 'AIR TOXIC' EMISSIONS FROM MISCELLANEOUS SULFITE PULPING SOURCES, CONTD.

SOURCE: REDSTOCK WASHING SOURCES

VOLATILE ORGANIC COMPOUND		MILL CODE	AVG EMISSIONS lb/ODTP	TEST METHOD	COMMENTS
TETRACHLOROETHYLENE		RSWMI	ND[1.7E-04]	HEATED CANISTER	FID WITH CONCENTRATOR
TETRACHLOROETHYLENE		RSWMP	1.1E-03	HEATED CANISTER	FID WITH CONCENTRATOR, U
NO. TESTED	DETECTS		MEDIAN		
2	1		5.9E-04		
TOLUENE		RSWMI	2.1E-04	HEATED CANISTER	FID WITH CONCENTRATOR
TOLUENE		RSWMP	ND[1.3E-04]	HEATED CANISTER	FID WITH CONCENTRATOR
NO. TESTED	DETECTS		MEDIAN		
2	1		1.4E-04		
1,2,4-TRICHLOROBENZENE		RSWMI	ND[6.4E-04]	HEATED CANISTER	FID WITH CONCENTRATOR
1,2,4-TRICHLOROBENZENE		RSWMP	3.8E-04	HEATED CANISTER	FID WITH CONCENTRATOR
NO. TESTED	DETECTS		MEDIAN		
2	1		3.5E-04		
1,1,1-TRICHLOROETHANE		RSWMP	ND[7.1E-04]	HEATED CANISTER	FID WITH CONCENTRATOR
1,1,2-TRICHLOROETHANE		RSWMI	ND[1.4E-03]	HEATED CANISTER	FID WITH CONCENTRATOR, U
1,1,2-TRICHLOROETHANE		RSWMP	ND[7.1E-04]	HEATED CANISTER	FID WITH CONCENTRATOR
NO. TESTED	DETECTS		MEDIAN		
2	0		ND		
TRICHLOROETHYLENE		RSWMI	ND[1.4E-03]	HEATED CANISTER	FID WITH CONCENTRATOR
TRICHLOROETHYLENE		RSWMP	ND[7.0E-04]	HEATED CANISTER	FID WITH CONCENTRATOR
NO. TESTED	DETECTS		MEDIAN		
2	0		ND		
m,p-XYLENE		RSWMI	ND[3.7E-04]	HEATED CANISTER	FID WITH CONCENTRATOR
m,p-XYLENE		RSWMP	4.9E-04	HEATED CANISTER	FID WITH CONCENTRATOR
NO. TESTED	DETECTS		MEDIAN		
2	1		3.4E-04		
o-XYLENE		RSWMI	3.2E-04	HEATED CANISTER	FID WITH CONCENTRATOR
o-XYLENE		RSWMP	8.4E-04	HEATED CANISTER	FID WITH CONCENTRATOR
NO. TESTED	DETECTS		MEDIAN		
2	2		5.8E-04		
TERPENES		RSWMI	3.7E-02	HEATED CANISTER	FID WITH CONCENTRATOR
TERPENES		RSWMP	2.6E-01	HEATED CANISTER	FID WITH CONCENTRATOR
NO. TESTED	DETECTS		MEDIAN		
2	2		1.5E-01		
			lb C/ODTP		
TOTAL HYDROCARBONS		RSWMI	7.2E-02	M25A	
TOTAL HYDROCARBONS		RSWMP	1.6E-01	M25A	
NO. TESTED	DETECTS		MEDIAN		
2	2		1.2E-01		

Notes

U - unidentified and unconfirmed by GC/MSD

MEDIAN - empirical median; MEDIAN* - "NORPLOT" median; MEDIAN** - "SDln" median

TABLE 10 SUMMARY OF 'AIR TOXIC' EMISSIONS FROM MISCELLANEOUS SULFITE PULPING SOURCES, CONTD.

SOURCE: NUISANCE SCRUBBERS

VOLATILE ORGANIC COMPOUND		MILL CODE	AVG EMISSIONS lb/ODTP	TEST METHOD	COMMENTS
ACETALDEHYDE		NSMI	9.4E-04	HEATED CANISTER	FID WITH CONCENTRATOR
ACETALDEHYDE		NSMP	4.8E-03	HEATED CANISTER	FID WITH CONCENTRATOR
NO. TESTED	DETECTS		MEDIAN		
2	2		2.9E-03		
ACETONE		NSMI	6.8E-04	HEATED CANISTER	FID WITH CONCENTRATOR
ACETONE		NSMP	1.9E-02	HEATED CANISTER	FID WITH CONCENTRATOR
NO. TESTED	DETECTS		MEDIAN		
2	2		9.8E-03		
ACROLEIN		NSMI	ND[2.7E-05]	HEATED CANISTER	FID WITH CONCENTRATOR
ACROLEIN		NSMP	ND[4.3E-04]	HEATED CANISTER	FID WITH CONCENTRATOR
NO. TESTED	DETECTS		MEDIAN		
2	0		ND		
BENZENE		NSMI	1.6E-05	HEATED CANISTER	FID WITH CONCENTRATOR
BENZENE		NSMP	ND[2.0E-04]	HEATED CANISTER	FID WITH CONCENTRATOR
NO. TESTED	DETECTS		MEDIAN		
2	1		1.6E-05		
CARBON TETRACHLORIDE		NSMI	ND[2.9E-04]	HEATED CANISTER	FID WITH CONCENTRATOR
CARBON TETRACHLORIDE		NSMP	ND[4.7E-03]	HEATED CANISTER	FID WITH CONCENTRATOR
NO. TESTED	DETECTS		MEDIAN		
2	0		ND		
CHLOROBENZENE		NSMI	1.4E-05	HEATED CANISTER	FID WITH CONCENTRATOR, U
CHLOROBENZENE		NSMP	ND[2.9E-04]	HEATED CANISTER	FID WITH CONCENTRATOR
NO. TESTED	DETECTS		MEDIAN		
2	1		1.4E-05		
CHLOROFORM		NSMI	3.6E-04	HEATED CANISTER	FID WITH CONCENTRATOR, U
CHLOROFORM		NSMP	ND[3.7E-03]	HEATED CANISTER	FID WITH CONCENTRATOR
NO. TESTED	DETECTS		MEDIAN		
2	1		3.6E-04		
DIMETHYL DISULFIDE		NSMI	ND[7.4E-04]	HEATED CANISTER	FID WITH CONCENTRATOR
DIMETHYL DISULFIDE		NSMP	ND[1.2E-02]	HEATED CANISTER	FID WITH CONCENTRATOR
NO. TESTED	DETECTS		MEDIAN		
2	0		ND		
1,2-DICHLOROETHANE		NSMI	ND[6.2E-05]	HEATED CANISTER	FID WITH CONCENTRATOR
1,2-DICHLOROETHANE		NSMP	ND[1.0E-03]	HEATED CANISTER	FID WITH CONCENTRATOR
NO. TESTED	DETECTS		MEDIAN		
2	0		ND		

TABLE 10 SUMMARY OF 'AIR TOXIC' EMISSIONS FROM MISCELLANEOUS SULFITE PULPING SOURCES, CONTD.

SOURCE: NUISANCE SCRUBBERS

VOLATILE ORGANIC COMPOUND		MILL CODE	AVG EMISSIONS lb/ODTP	TEST METHOD	COMMENTS
1,2-DICHLOROETHYLENE		NSMI	9.4E-05	HEATED CANISTER	FID WITH CONCENTRATOR, U
1,2-DICHLOROETHYLENE		NSMP	ND[7.5E-04]	HEATED CANISTER	FID WITH CONCENTRATOR
NO. TESTED	DETECTS		MEDIAN		
2	1		9.4E-05		
DIMETHYL SULFIDE		NSMI	ND[4.9E-04]	HEATED CANISTER	FID WITH CONCENTRATOR
DIMETHYL SULFIDE		NSMP	ND[8.0E-03]	HEATED CANISTER	FID WITH CONCENTRATOR
NO. TESTED	DETECTS		MEDIAN		
2	0		ND		
FORMALDEHYDE		NSMI	4.5E-04	NMIT	NCASI IMPINGER METHOD
FORMALDEHYDE		NSMP	4.3E-03	NMIT	NCASI IMPINGER METHOD
NO. TESTED	DETECTS		MEDIAN		
2	2		2.4E-03		
n-HEXANE		NSMP	ND[2.2E-04]	HEATED CANISTER	FID WITH CONCENTRATOR
METHANOL		NSMI	1.1E-02	HEATED CANISTER	FID WITH CONCENTRATOR
METHANOL		NSMP	9.1E-01	HEATED CANISTER	FID WITH CONCENTRATOR
NO. TESTED	DETECTS		MEDIAN		
2	2		4.6E-01		
METHYL ETHYL KETONE		NSMI	ND[8.7E-04]	NMIT	NCASI IMPINGER METHOD
METHYL ETHYL KETONE		NSMP	ND[6.9E-04]	HEATED CANISTER	FID WITH CONCENTRATOR
NO. TESTED	DETECTS		MEDIAN		
2	0		ND		
METHYL ISOBUTYL KETONE		NSMP	ND[2.3E-04]	HEATED CANISTER	FID WITH CONCENTRATOR
METHYL MERCAPTAN		NSMI	ND[3.8E-04]	HEATED CANISTER	FID WITH CONCENTRATOR
METHYL MERCAPTAN		NSMP	ND[6.2E-03]	HEATED CANISTER	FID WITH CONCENTRATOR
NO. TESTED	DETECTS		MEDIAN		
2	0		ND		
METHYLENE CHLORIDE		NSMI	ND[1.1E-04]	HEATED CANISTER	FID WITH CONCENTRATOR
METHYLENE CHLORIDE		NSMP	ND[1.9E-03]	HEATED CANISTER	FID WITH CONCENTRATOR
NO. TESTED	DETECTS		MEDIAN		
2	0		ND		
STYRENE		NSMI	5.2E-05	HEATED CANISTER	FID WITH CONCENTRATOR
STYRENE		NSMP	ND[2.7E-04]	HEATED CANISTER	FID WITH CONCENTRATOR
NO. TESTED	DETECTS		MEDIAN		
2	1		5.2E-05		

TABLE 10 SUMMARY OF 'AIR TOXIC' EMISSIONS FROM MISCELLANEOUS SULFITE PULPING SOURCES, CONTD.

SOURCE: NUISANCE SCRUBBERS

VOLATILE ORGANIC COMPOUND		MILL CODE	AVG EMISSIONS lb/ODTP	TEST METHOD	COMMENTS
TETRACHLOROETHYLENE		NSMI	ND[7.8E-05]	HEATED CANISTER	FID WITH CONCENTRATOR
TETRACHLOROETHYLENE		NSMP	ND[1.3E-03]	HEATED CANISTER	FID WITH CONCENTRATOR
NO. TESTED	DETECTS		MEDIAN		
2	0		ND		
TOLUENE		NSMI	6.7E-05	HEATED CANISTER	FID WITH CONCENTRATOR
TOLUENE		NSMP	1.4E-03	HEATED CANISTER	FID WITH CONCENTRATOR
NO. TESTED	DETECTS		MEDIAN		
2	2		7.3E-04		
1,1,1-TRICHLOROETHANE		NSMP	1.8E-03	HEATED CANISTER	FID WITH CONCENTRATOR, U
1,1,2-TRICHLOROETHANE		NSMI	ND[6.3E-05]	HEATED CANISTER	FID WITH CONCENTRATOR
1,1,2-TRICHLOROETHANE		NSMP	ND[1.0E-03]	HEATED CANISTER	FID WITH CONCENTRATOR
NO. TESTED	DETECTS		MEDIAN		
2	0		ND		
TRICHLOROETHYLENE		NSMI	ND[6.2E-05]	HEATED CANISTER	FID WITH CONCENTRATOR
TRICHLOROETHYLENE		NSMP	ND[1.0E-03]	HEATED CANISTER	FID WITH CONCENTRATOR
NO. TESTED	DETECTS		MEDIAN		
2	0		ND		
1,2,4-TRICHLOROBENZENE		NSMI	ND[2.9E-05]	HEATED CANISTER	FID WITH CONCENTRATOR
1,2,4-TRICHLOROBENZENE		NSMP	ND[4.6E-04]	HEATED CANISTER	FID WITH CONCENTRATOR
NO. TESTED	DETECTS		MEDIAN		
2	0		ND		
m,p-XYLENE		NSMI	3.9E-05	HEATED CANISTER	FID WITH CONCENTRATOR
m,p-XYLENE		NSMP	1.2E-03	HEATED CANISTER	FID WITH CONCENTRATOR
NO. TESTED	DETECTS		MEDIAN		
2	2		6.2E-04		
o-XYLENE		NSMI	2.0E-04	HEATED CANISTER	FID WITH CONCENTRATOR
o-XYLENE		NSMP	ND[2.7E-04]	HEATED CANISTER	FID WITH CONCENTRATOR
NO. TESTED	DETECTS		MEDIAN		
2	1		1.7E-04		
TERPENES		NSMI	5.2E-02	HEATED CANISTER	FID WITH CONCENTRATOR
TERPENES		NSMP	SAT	HEATED CANISTER	FID WITH CONCENTRATOR
NO. TESTED	DETECTS		MEDIAN		
2	2		>5.2E-02		
			lb C/ODTP		
TOTAL HYDROCARBONS		NSMI	7.6E-02	M25A	
TOTAL HYDROCARBONS		NSMP	2.0E+00	M25A	
NO. TESTED	DETECTS		MEDIAN		
2	2		1.0E+00		

Notes

U - unidentified and unconfirmed by GC/MSD

SAT - saturated (above detector quantitation limit)

MEDIAN - empirical median; MEDIAN* - "NORPLOT" median; MEDIAN** - "SDln median

TABLE 10 SUMMARY OF 'AIR TOXIC' EMISSIONS FROM MISCELLANEOUS SULFITE PULPING SOURCES, CONTD.

SOURCE: SULFITE PULPING BLEACH PLANT

VOLATILE ORGANIC COMPOUND	MILL CODE	TOTAL EMISSIONS lb/ODTP	TEST METHOD	COMMENTS
ACETALDEHYDE	BPSMI	1.1E-01	HEATED CANISTER	FID WITH CONCENTRATOR
ACETONE	BPSMI	1.6E-01	HEATED CANISTER	FID WITH CONCENTRATOR
ACROLEIN	BPSMI	4.0E-04	HEATED CANISTER	FID WITH CONCENTRATOR
BENZENE	BPSMI	2.6E-04	HEATED CANISTER	FID WITH CONCENTRATOR
CARBON TETRACHLORIDE	BPSMI	3.6E-03	HEATED CANISTER	FID WITH CONCENTRATOR
CHLOROBENZENE	BPSMI	2.3E-04	HEATED CANISTER	FID WITH CONCENTRATOR
CHLOROFORM	BPSMI	3.3E-03	HEATED CANISTER	FID WITH CONCENTRATOR
DIMETHYL DISULFIDE	BPSMI	ND[1.2E-02]	HEATED CANISTER	FID WITH CONCENTRATOR
1,2-DICHLOROETHANE	BPSMI	ND[1.5E-03]	HEATED CANISTER	FID WITH CONCENTRATOR
1,2-DICHLOROETHYLENE	BPSMI	8.4E-04	HEATED CANISTER	FID WITH CONCENTRATOR
DIMETHYL SULFIDE	BPSMI	ND[1.2E-02]	HEATED CANISTER	FID WITH CONCENTRATOR
FORMALDEHYDE	BPSMI	1.6E-02	NMIT	NCASI IMPINGER METHOD
METHANOL	BPSMI	6.2E-01	HEATED CANISTER	FID WITH CONCENTRATOR
METHYL ETHYL KETONE	BPSMI	1.2E-01	NMIT	NCASI IMPINGER METHOD
METHYL MERCAPTAN	BPSMI	ND[9.3E-03]	HEATED CANISTER	FID WITH CONCENTRATOR
METHYLENE CHLORIDE	BPSMI	ND[3.3E-03]	HEATED CANISTER	FID WITH CONCENTRATOR
STYRENE	BPSMI	2.4E-03	HEATED CANISTER	FID WITH CONCENTRATOR
TETRACHLOROETHYLENE	BPSMI	ND[1.9E-03]	HEATED CANISTER	FID WITH CONCENTRATOR
TOLUENE	BPSMI	6.2E-04	HEATED CANISTER	FID WITH CONCENTRATOR
1,1,2-TRICHLOROETHANE	BPSMI	ND[1.6E-03]	HEATED CANISTER	FID WITH CONCENTRATOR
TRICHLOROETHYLENE	BPSMI	8.2E-04	HEATED CANISTER	FID WITH CONCENTRATOR
1,2,4-TRICHLOROBENZENE	BPSMI	ND[7.0E-04]	HEATED CANISTER	FID WITH CONCENTRATOR
m,p-XYLENE	BPSMI	3.4E-04	HEATED CANISTER	FID WITH CONCENTRATOR
o-XYLENE	BPSMI	1.0E-03	HEATED CANISTER	FID WITH CONCENTRATOR
TERPENES	BPSMI	8.5E-02	HEATED CANISTER	FID WITH CONCENTRATOR
		lb C/ODTP		
TOTAL HYDROCARBONS	BPSMI	2.5E-01	M25A	

TABLE 10 SUMMARY OF 'AIR TOXIC' EMISSIONS FROM MISCELLANEOUS SULFITE PULPING SOURCES, CONTD.

SOURCE: COMBINED DIGESTER EVACUATION VENT

VOLATILE ORGANIC COMPOUND	MILL CODE	TOTAL EMISSIONS lb/ton CHIPS	TEST METHOD	COMMENTS
ACETALDEHYDE	CDEVMP	6.1E-05	HEATED CANISTER	FID WITH CONCENTRATOR
ACETONE	CDEVMP	5.4E-05	HEATED CANISTER	FID WITH CONCENTRATOR
ACROLEIN	CDEVMP	ND[1.8E-05]	HEATED CANISTER	FID WITH CONCENTRATOR
BENZENE	CDEVMP	ND[8.5E-06]	HEATED CANISTER	FID WITH CONCENTRATOR
CARBON TETRACHLORIDE	CDEVMP	ND[2.0E-04]	HEATED CANISTER	FID WITH CONCENTRATOR
CHLOROBENZENE	CDEVMP	ND[1.2E-05]	HEATED CANISTER	FID WITH CONCENTRATOR
CHLOROFORM	CDEVMP	ND[1.6E-04]	HEATED CANISTER	FID WITH CONCENTRATOR
DIMETHYL DISULFIDE	CDEVMP	ND[5.1E-04]	HEATED CANISTER	FID WITH CONCENTRATOR
1,2-DICHLOROETHANE	CDEVMP	ND[4.3E-05]	HEATED CANISTER	FID WITH CONCENTRATOR
1,2-DICHLOROETHYLENE	CDEVMP	3.1E-05	HEATED CANISTER	FID WITH CONCENTRATOR, U
DIMETHYL SULFIDE	CDEVMP	ND[3.4E-04]	HEATED CANISTER	FID WITH CONCENTRATOR
FORMALDEHYDE	CDEVMP	1.7E-04	NMIT	NCASI IMPINGER METHOD
n-HEXANE	CDEVMP	ND[9.3E-06]	HEATED CANISTER	FID WITH CONCENTRATOR
METHANOL	CDEVMP	7.6E-04	HEATED CANISTER	FID WITH CONCENTRATOR
METHYL ETHYL KETONE	CDEVMP	ND[2.9E-05]	NMIT	NCASI IMPINGER METHOD
METHYL MERCAPTAN	CDEVMP	ND[2.6E-04]	HEATED CANISTER	FID WITH CONCENTRATOR
METHYLENE CHLORIDE	CDEVMP	ND[7.9E-05]	HEATED CANISTER	FID WITH CONCENTRATOR
STYRENE	CDEVMP	ND[1.1E-05]	HEATED CANISTER	FID WITH CONCENTRATOR
TETRACHLOROETHYLENE	CDEVMP	ND[5.4E-05]	HEATED CANISTER	FID WITH CONCENTRATOR
TOLUENE	CDEVMP	5.3E-06	HEATED CANISTER	FID WITH CONCENTRATOR
1,1,1-TRICHLOROETHANE	CDEVMP	ND[4.3E-05]	HEATED CANISTER	FID WITH CONCENTRATOR
1,1,2-TRICHLOROETHANE	CDEVMP	ND[4.3E-05]	HEATED CANISTER	FID WITH CONCENTRATOR
TRICHLOROETHYLENE	CDEVMP	ND[5.4E-05]	HEATED CANISTER	FID WITH CONCENTRATOR
1,2,4-TRICHLOROBENZENE	CDEVMP	ND[2.0E-05]	HEATED CANISTER	FID WITH CONCENTRATOR
m,p-XYLENE	CDEVMP	ND[1.1E-05]	HEATED CANISTER	FID WITH CONCENTRATOR
o-XYLENE	CDEVMP	1.7E-05	HEATED CANISTER	FID WITH CONCENTRATOR
TERPENES	CDEVMP	7.8E-04	HEATED CANISTER	FID WITH CONCENTRATOR
		lb C/ton CHIPS		
TOTAL HYDROCARBONS	CDEVMP	5.9E-04	M25A	

Notes

U - unidentified and unconfirmed by GC/MSD

TABLE 10 SUMMARY OF 'AIR TOXIC' EMISSIONS FROM MISCELLANEOUS SULFITE PULPING SOURCES, CONTD.

SOURCE: COMBINED BLOW PIT VENT

VOLATILE ORGANIC COMPOUND	MILL CODE	TOTAL EMISSIONS lb/ODTP	TEST METHOD	COMMENTS
ACETALDEHYDE	CBPVMP	2.1E-03	HEATED CANISTER	FID WITH CONCENTRATOR
ACETONE	CBPVMP	1.4E-01	HEATED CANISTER	FID WITH CONCENTRATOR
ACROLEIN	CBPVMP	ND[4.5E-04]	HEATED CANISTER	FID WITH CONCENTRATOR
BENZENE	CBPVMP	ND[2.1E-04]	HEATED CANISTER	FID WITH CONCENTRATOR
CARBON TETRACHLORIDE	CBPVMP	5.4E-03	HEATED CANISTER	FID WITH CONCENTRATOR, U
CHLOROBENZENE	CBPVMP	1.3E-03	HEATED CANISTER	FID WITH CONCENTRATOR, U
CHLOROFORM	CBPVMP	ND[3.8E-03]	HEATED CANISTER	FID WITH CONCENTRATOR
DIMETHYL DISULFIDE	CBPVMP	ND[1.3E-02]	HEATED CANISTER	FID WITH CONCENTRATOR
1,2-DICHLOROETHANE	CBPVMP	1.8E-03	HEATED CANISTER	FID WITH CONCENTRATOR, U
1,2-DICHLOROETHYLENE	CBPVMP	ND[7.7E-04]	HEATED CANISTER	FID WITH CONCENTRATOR
DIMETHYL SULFIDE	CBPVMP	ND[8.3E-03]	HEATED CANISTER	FID WITH CONCENTRATOR
FORMALDEHYDE	CBPVMP	ND[9.5E-04]	NMIT	NCASI IMPINGER METHOD
n-HEXANE	CBPVMP	2.0E-02	HEATED CANISTER	FID WITH CONCENTRATOR
METHANOL	CBPVMP	7.9E+00	HEATED CANISTER	FID WITH CONCENTRATOR
METHYL ETHYL KETONE	CBPVMP	4.6E-03	NMIT	NCASI IMPINGER METHOD
METHYL MERCAPTAN	CBPVMP	ND[6.4E-03]	HEATED CANISTER	FID WITH CONCENTRATOR
METHYLENE CHLORIDE	CBPVMP	ND[1.9E-03]	HEATED CANISTER	FID WITH CONCENTRATOR
STYRENE	CBPVMP	6.9E-03	HEATED CANISTER	FID WITH CONCENTRATOR
TETRACHLOROETHYLENE	CBPVMP	2.0E-03	HEATED CANISTER	FID WITH CONCENTRATOR, U
TOLUENE	CBPVMP	1.4E-03	HEATED CANISTER	FID WITH CONCENTRATOR
1,1,1-TRICHLOROETHANE	CBPVMP	2.2E-03	HEATED CANISTER	FID WITH CONCENTRATOR, U
1,1,2-TRICHLOROETHANE	CBPVMP	ND[1.1E-03]	HEATED CANISTER	FID WITH CONCENTRATOR
TRICHLOROETHYLENE	CBPVMP	ND[1.0E-03]	HEATED CANISTER	FID WITH CONCENTRATOR
1,2,4-TRICHLOROBENZENE	CBPVMP	3.9E-03	HEATED CANISTER	FID WITH CONCENTRATOR, U
m,p-XYLENE	CBPVMP	6.3E-03	HEATED CANISTER	FID WITH CONCENTRATOR
o-XYLENE	CBPVMP	1.5E-03	HEATED CANISTER	FID WITH CONCENTRATOR
TERPENES	CBPVMP	SAT	HEATED CANISTER	FID WITH CONCENTRATOR
		lb C/ODTP		
TOTAL HYDROCARBONS	CBPVMP	2.5E-01	M25A	

Notes

U - unidentified and unconfirmed by GC/MSD

SAT - saturated (above detector quantitation limit)