Air Quality Permitting
Technical Memorandum

Permit to Construct No. 031-00019

BOISE CASCADE CORP.
CORRUGATED CONTAINER OPERATIONS
BURLEY, IDAHO

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ACRONYMS, UNITS, AND CHEMICAL NOMENCLATURE

AFS	AIRS Facility Subsystem
AIRS	Aerometric Information Retrieval System
BCC	Boise Cascade Corp.
Btu	British thermal unit
CFR	Code of Federal Regulations
CO	carbon monoxide
DEQ	Department of Environmental Quality
HAPs	hazardous air pollutants
IDAPA	a numbering designation for all administrative rules in Idaho promulgated in accordance with the Idaho Administrative Procedures Act
lb/hr	pound per hour
MACT	Maximum Achievable Control Technology
mg/m^3	milligrams per cubic meter
NAAQS	National Ambient Air Quality Standards
NESHAP	Nation Emission Standards for Hazardous Air Pollutants
NO_X	nitrogen oxides
NSPS	New Source Performance Standards
PM	particulate matter
PM_{10}	particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers
PSD	Prevention of Significant Deterioration
PTC	permit to construct
SIP	State Implementation Plan
SO_2	sulfur dioxide
T/yr	tons per year
VOC	volatile organic compound

1. PURPOSE

The purpose for this memorandum is to satisfy the requirements of IDAPA 58.01.01.200, *Rules for the Control of Air Pollution in Idaho,* for issuing permits to construct (PTC).

2. PROJECT DESCRIPTION

Boise Cascade Corp. (BCC) is proposing to increase the permitted daily throughput limit at their corrugated container facility in Burley.

3. SUMMARY OF EVENTS

September 4, 2002	The Idaho Department of Environmental Quality (DEQ) received an application from BCC for an increase in their daily throughput limit.
September 25, 2002	The application was determined complete.
October 11, 2002	DEQ determined that a better modeling demonstration was necessary to show compliance with National Ambient Air Quality Standards (NAAQS) and requested more information from BCC. DEQ determined that the ISCPrime model was needed because of the building's close proximity to the fenceline.
November 18, 2002	BCC submitted an updated model.

4. PERMIT HISTORY

April 9, 1991	PTC No. 031-00019 was issued for BCC's boilers.
January 26, 1996	PTC No. 031-00019 was issued for BCC's starch silo.
April 11, 2000	PTC No. 031-00019 was issued for BCC's flexographic printer.
May 17, 2002	PTC No. 031-00019 was issued for two new single facers.

5. TECHNICAL ANALYSIS

Process Description

When the two single facer machines were added to the corrugator facility the container sheet throughput was increased to 1.8 billion square feet per year in a previous permit modification. BCC proposes to increase the daily throughput limit to 10.44 million square feet per day.

New Equipment

No new equipment is associated with this modification. BCC submitted a facility-wide model to show that the emissions from their current equipment, when operating at a higher daily rate, will not violate any ambient air quality standards.

Emissions Estimates

Corrugator Emissions

Emissions from the corrugator, which are emitted through the building vents, were estimated using the building's indoor particulate matter with (PM_{10}) concentration. The PM_{10} concentration was determined from industrial hygiene sampling using NIOSH Method 0500. The indoor concentration of 0.25 milligrams per cubic meter (mg/m^3) results in an average hourly emissions rate of 0.075 pounds per hour (lb/hr) from the building vents. A copy of the industrial hygiene sampling is shown in Appendix B.

Cyclone

Emissions from the cyclone were estimated using particulate emissions data based on a source test conducted by Landau Associates and AP-42 data for cyclones. BCC assumed that 50% of the total particulate matter determined by the Landau study was PM_{10}. This assumption is based on AP-42 data for cyclones showing that cyclone emissions from belt sanders are 50% PM_{10}. Since sander dust is finer than the scrap collected from the corrugator, it is reasonable to assume that PM_{10} emissions will be less than 50% of the PM emissions. A copy of the particle size distribution for belt sander cyclones is shown in Appendix C.

Starch Silo

Emissions from the starch silo did not change with this permit modification. The hourly rate calculated in the starch silo permit was used in the modeling analysis for this permit.

Boilers

Emission from the boilers were estimated assuming that the boilers burn No. 2 diesel for up to 30 days per year and natural gas for the remainder. The peak hourly rate is 0.883 lb/hr PM_{10}. The analysis can be found in the January 19, 1996, technical memorandum. This permit allows the facility to operate for 720 hours per consecutive 12 month period on No. 2 diesel fuel.

A summary of the facility's particulate emissions is shown in the following table:

Table 5.1 PARTICULATE EMISSIONS

PM_{10} Emissions Rates		
	lb/hr	T/yr
Cyclone	0.945	4.14
Building – Corrugator	0.075	0.33
Starch Silo	0.077	0.34
Boilers	0.883	1.12

Modeling

The modeling submitted by BCC was reviewed by Kevin Schilling of DEQ. The resulting ambient concentrations were within the NAAQS. The modeling review is shown in Appendix A.

Facility Classification

The facility classification has been changed with this permit modification. DEQ has determined that the potential emissions are not large enough to classify this facility as a synthetic minor facility. This facility is now classified as a natural minor (B) facility, since its potential to emit is less than the following:

- 100 tons per year (T/yr) of any regulated pollutant
- 10 T/yr of any single hazardous air pollutant
- 25 T/yr of any combination of hazardous air pollutants

Area Classification

This facility is located in Burley, Idaho, which is unclassifiable for all criteria air pollutants. The location is in Air Quality Control Region 63 and Zone 12.

Regulatory Review

IDAPA 58.01.01.201 Permit to Construct Required

The proposed changes at the BCC facility increase emissions and require a PTC.

IDAPA 58.01.01.210 Demonstration of Preconstruction Compliance with Toxic Standards

BCC has demonstrated preconstruction compliance with toxic standards. There is no increase in hourly toxic emissions.

IDAPA 58.01.01.577 Ambient Air Quality Standards for Specific Air Pollutants

The proposed modifications comply with ambient air quality standards.

40 CFR 52 Prevention of Significant Deterioration (PSD)

The emissions from this facility are less than 100 tons per year. Therefore, this modification does not trigger PSD requirements.

40 CFR 60 New Source Performance Standards (NSPS)

The proposed modification does not involve any equipment or processes that are affected by 40 CFR 60. The facility has two boilers that are greater than 10 million British thermal units per hour (Btu/hr), but they were installed prior to the applicable effective date.

40 CFR 61 & 63 National Emission Standards for Hazardous Air Pollutants (NESHAP) and MACT

This facility is not a major facility for Hazardous Air Pollutants (HAPs), and therefore, is unaffected by 40 CFR 63 Subpart KK.

6. PERMIT REQUIREMENTS

Emission Limits

The particulate emissions limits were reduced for the starch silo, building, and cyclone because BCC used lower rates to demonstrate compliance with the NAAQS. These lower rates were based upon industrial hygiene sampling data to determine PM_{10} emissions from the building and an assumption that 50% of total particulate matter (PM) is PM_{10} based upon cyclone source testing and AP-42 data. The starch silo emissions limit was reduced to 0.077 lb/hr, the building vents emissions limit was reduced to 0.075 lb/hr, and the cyclone emissions limit was reduced to 0.945 lb/hr. All of the hourly emissions limits are based on an average hourly rate over a 24-hour time period.

Operating Requirements

The throughput of the corrugator is limited to 1.8 billion square feet per year and 10.44 million square feet per day and the starch silo is limited to 4,380 tons of starch per 12 consecutive month period. BCC may only operate their boilers on No. 2 diesel fuel for 720 hours per consecutive 12 month period.

Compliance Demonstration

BCC will demonstrate compliance with the emissions limits by complying with the production limits established in the PTC. The facility will show compliance with the production limits by keeping records of the square feet of corrugated container sheets and the tons of starch used. Each month BCC will record the hours that the boilers are operated on No. 2 diesel fuel and compile the total hours over the past 12 months.

7. AIRS INFORMATION

AIRS/AFS FACILITY-WIDE CLASSIFICATION[a] DATA ENTRY FORM

AIR PROGRAM / POLLUTANT	SIP	PSD	NSPS (Part 60)	NESHAP (Part 61)	MACT (Part 63)	TITLE V	AREA CLASSIFICATION A – Attainment U – Unclassifiable N – Nonattainment
SO_2	B						U
NO_x	B						U
CO	B						U
PM_{10}	B						U
PT (Particulate)	B						
VOC	B						U
THAP (Total HAPs)	B						
			APPLICABLE SUBPART				

Aerometric Information Retrieval System (AIRS) Facility Subsystem (AFS)

[a] AIRS/AFS Classification Codes:

A = Actual or potential emissions of a pollutant are above the applicable major source threshold. For NESHAP only, class "A" is applied to each pollutant which is below the 10 T/yr threshold, but which contributes to a plant total in excess of 25 T/yr of all NESHAP pollutants.

SM = Potential emissions fall below applicable major source thresholds if and only if the source complies with federally enforceable regulations or limitations.

B = Actual and potential emissions below all applicable major source thresholds.

C = Class is unknown.

ND = Major source thresholds are not defined (e.g., radionuclides).

8. FEES

BCC paid the $1,000 application fee as required in IDAPA 58.01.01.224. A PTC processing fee of $1,000 is required in accordance with IDAPA 58.01.01.225, because the increase in emissions from the modification was less than 1 T/yr as indicated in Table 8.1. The processing fee was received on December 12, 2002.

The BCC facility is not a major facility as defined in IDAPA 58.01.01.008.10. Therefore, registration fees are not applicable in accordance with IDAPA 58.01.01.387.

Table 8.1 EMISSIONS INVENTORY

Emissions Inventory			
Pollutant	**Annual Emissions Increase (T/yr)**	**Annual Emissions Reduction (T/yr)**	**Annual Emissions Change (T/yr)**
NO_X	0.0	0	0.0
SO_2	0.0	0	0.0
CO	0.0	0	0.0
PM_{10}	0.0	0	0.0
VOC	0.0	0	0.0
TAPS/HAPS	0.0	0	0.0
Total:	0.0	0	0.0
Fee Due:	0.00		

9. RECOMMENDATION

Based on review of the application materials and all applicable state and federal rules and regulations, staff recommends the BCC facility be issued a PTC for the increased daily throughput limit. No public comment period is recommended, no entity has requested a comment period, and the project does not involve PSD PTC requirements.

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cc: Bill Allred, Twin Falls Regional Office
Sherry Davis, State AQ Program Office

APPENDIX A
Modeling Review

MEMORANDUM

TO: Dustin Holloway, Air Quality Engineer, Air Program Division
Mary Anderson, Air Modeling Coordinator, Air Program Division

FROM: Kevin Schilling, Air Quality Scientist, State Office of Technical Services

SUBJECT: Modeling review for the Boise Cascade Corporation – Burley Container Operations, PTC application for increased daily throughput at their Burley, Idaho, facility

DATE: January 6, 2003

1.0 SUMMARY:

Boise Cascade Corporation – Burley Container Operations (Boise Cascade) submitted a Permit to Construct (PTC) application to increase daily throughput at their corrugated container facility located in Burley, Idaho. Atmospheric dispersion modeling of both the emission increase associated with the requested throughput increase and facility-wide emissions were submitted with the PTC application to demonstrate that emissions from the modification would not cause or significantly contribute to a violation of an ambient air quality standard, as required by IDAPA 58.01.01.203.02.

2.0 DISCUSSION:

This section describes the regulatory modeling requirements and the methodology used for the analyses performed.

2.1 Introduction and Regulatory Requirements for Modeling

A PTC was recently issued to the Boise Cascade facility for installation of two new single facers on the corrugator. The project was estimated to allow a sheet throughput increase from 1.5 billion to 1.8 billion square feet per year. DEQ imposed a 5.05 million square feet per day throughput limit based on the average daily throughput (1.8 billion ft^2/ 365 day).

On August 29, 2002, DEQ received a PTC application from Boise Cascade for a modification at their facility located in Burley, Idaho. The modification consists of a daily throughput increase for the corrugators to 10.44 million square feet per day. The annual allowable throughput will remain at 1.8 billion ft^2/year.

No PTC can be granted, per IDAPA 58.01.01.203.02, unless the applicant demonstrates to the satisfaction of DEQ that emissions from the new source or modification "would not cause or significantly contribute to a violation of any ambient air quality standard." Emissions estimates and atmospheric dispersion modeling analyses were provided by Boise Cascade's consultant, Parametrix.

Dispersion modeling of facility-wide emissions was required because initial modeling results indicated that emissions increases associated with the modification could result in a "significant contribution" increase in pollutant concentrations in ambient air. A significant contribution is defined by IDAPA 58.01.01.006.93.

The application was determined complete by DEQ on September 25, 2002. DEQ later requested subsequent information and adjustments to the modeling analyses. Revisions to the application and facility-wide modeling analyses were received by DEQ via email on November 6 and 13, 2002.

2.2 Applicable Air Quality Impact Limits and Required Analyses

The Boise Cascade facility is located in Cassia County, designated as an attainment or unclassifiable area for sulfur dioxide (SO_2), nitrogen dioxide (NO_2), carbon monoxide (CO), lead (Pb), ozone (O_3), and particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers (PM_{10}).

If estimated maximum ambient air impacts from the emissions increase associated with the modification exceed the "significant contribution" levels of IDAPA 58.01.01.006.93, then DEQ modeling guidance requires a full impact analysis. A full impact analysis for attainment area pollutants requires inclusion of all criteria pollutant emissions at the facility in the ambient impact analysis. DEQ approved background concentration values, appropriate for the facility's location for each pollutant and averaging time, are then added to the ambient impact results from the full impact modeling analysis. The resulting maximum pollutant concentrations in ambient air are then compared to National Ambient Air Quality Standards (NAAQS) listed in Table 1. Table 1 also specifies the modeled value that must be used for comparison to the NAAQS.

Table 1. Applicable Regulatory Limits

Pollutant	Averaging Period	Regulatory Limit[a] ($\mu g/m^3$)[b]	Modeled Value Used[c]
Nitrogen dioxide (NO_2)	Annual	100[d]	Maximum 1st highest[e]
Sulfur dioxide (SO_2)	3-hour	1,300[f]	Maximum 2nd highest[e]
	24-hour	365[f]	Maximum 2nd highest[e]
	Annual	80[d]	Maximum 1st highest[e]
Carbon monoxide (CO)	1-hour	40,000[f]	Maximum 2nd highest[e]
	8-hour	10,000[f]	Maximum 2nd highest[e]
PM_{10}[g]	24-hour	150[f]	Maximum 6th highest[e]
	Annual	50[d]	Maximum 1st highest[e]
Lead (Pb)	Quarterly	1.5[d]	Maximum 1st highest[e]

a. IDAPA 58.01.01.577
b. Micrograms per cubic meter
c. When using five years of meteorological data
d. Not to be exceeded
e. Concentration at any modeled receptor using five years of meteorological data
f. Not to be exceeded more than once per year
g. Particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers

Toxic Air Pollutant (TAP) requirements for PTCs are specified in IDAPA 58.01.01.210. If the net emissions increase associated with a new source or modification exceeds screening emission levels (ELs) of IDAPA 58.01.01.585 and IDAPA 58.01.01.586, then the ambient impact of the emissions increase must be estimated. If ambient impacts are less than applicable Acceptable Ambient Concentrations (AACs) for non-carcinogens of IDAPA 58.01.01.585 and Acceptable Ambient Concentrations for Carcinogens (AACCs) of IDAPA 58.01.01.586, then compliance with TAP requirements has been demonstrated.

2.3 Background Concentrations

DEQ has recently revised applicable background concentration values for numerous areas in Idaho. Background concentrations in areas where no monitoring data are available were based on monitoring data from areas with similar population density, meteorology, and emissions sources. The PTC application submitted did not include these revised background values. Background concentration values for rural, agricultural lands, shown in Table 2, were used for Boise Cascade analyses.

Table 2. Background Concentrations

Pollutant	Averaging Period	Background Concentration ($\mu g/m^3$)[a]
Nitrogen dioxide (NO_2)	Annual	17
Sulfur dioxide (SO_2)	3-hour	33
	24-hour	26
	Annual	7.3
Carbon monoxide (CO)	1-hour	3,600
	8-hour	2,300
PM_{10}[b]	24-hour	73
	Annual	26
Lead (Pb)	Quarterly	0.03

a. Micrograms per cubic meter

b. Particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers

2.4 Modeling Impact Assessment

Table 3 provides a summary of the modeling parameters used for the DEQ analysis.

Table 3. Modeling Parameters

Parameter	Description/Values	Documentation/Additional Description
Model	ISC-PRIME	Version 99020
Meteorological data	Surface - Heyburn, Idaho Upper Air – Boise, Idaho	September 2000 – August 2001 Files: HEYBFINAdjust.MET
Model options	Regulatory Default	Allow missing met data
Land use	Rural	Low population density in area and large fraction of agricultural land
Terrain	Flat terrain	
Building downwash	Used building profile input program for PRIME (BPIP-PRIME)	Building dimensions obtained from modeling files submitted
Receptor grids (See Figure 1)	Grid 1	25 meter spacing along site boundary out to 100 meters
	Grid 2	50 meter spacing out to 200 meters
Facility location (UTM)[a]	Easting	269 kilometers
	Northing	4,711 kilometers

a. Universal Transverse Mercator

2.4.1 Modeling Protocol

A modeling protocol was not submitted to DEQ prior to the application.

2.4.2 Model Selection

The initial ambient air impact analysis was performed by Parametrix using the model ISCST3 - Version 02035. DEQ verification modeling was performed using ISC-PRIME – Version 99020. ISC-Prime was used because of the close proximity of buildings to the facility property line requires consideration of pollutant concentrations within building recirculation cavities. ISCST3 does not calculate pollutant concentrations within building recirculation cavities.

2.4.3 Meteorological Data

Surface meteorological data from Heyburn, Idaho, were used in the modeling analyses. These data were collected from September 1, 2000 through August 31, 2001. Site quality assurance and

calibration information were provided to DEQ for a previous PTC application. Mixing height data were obtained from upper air sounding data collected at the Boise National Weather Service Station. DEQ verification modeling was performed using Heyburn meteorological data that were adjusted to correct artificially low mixing heights generated by the meteorological data preprocessor program PC-RAMMET. All rural mixing heights in the data below 30 meters were changed to a value of 30 meters.

2.4.4 Terrain Effects and Facility Layout

The modeling analyses submitted by Parametrix did not consider elevated terrain. DEQ used USGS 7.5 minute maps to verify that the area within the modeling domain is relatively flat with respect to dispersion modeling influences. DEQ also verified proper identification of the facility boundary and buildings on the site by comparing the modeling input to a facility plot plan submitted and aerial photographs of the area. Figure 1 shows the emission sources, buildings, and receptors included in the dispersion modeling analysis.

2.4.5 Building Downwash Effects

Plume downwash effects caused by structures present at the facility were accounted for in the modeling analysis. The Building Profile Input Program for ISC-PRIME (BPIP-PRIME) was used to calculate direction-specific building dimensions and Good Engineering Practice (GEP) stack height information from building dimensions/configurations and emissions release parameters.

2.4.6 Receptors

The originally submitted grid only extended out 100 meters from the facility boundary. DEQ verification modeling was conducted using the grid of ambient air receptors shown in Table 3, extending out to 200 meters. A larger receptor grid was not necessary for this facility because the configuration of roof-top vents and near roof-top emissions release points, when considering effects of building downwash, causes maximum impacts to be very near the source location.

2.4.7 Emission Rates

Emissions rates used in the dispersion modeling analyses submitted by the applicant were reviewed against those in the permit application. The following approach was used for DEQ verification modeling:

- All modeled emissions rates were equal to or greater than the emissions calculated in the PTC application or the permitted allowable rate.
- Emissions release parameters (stack location, stack height, stack diameter, exhaust temperature, and exhaust velocity) used in the model were checked against those specified in the PTC application.
- Modeling results were compared to "significant contribution" thresholds. More extensive review of modeling parameters selected was conducted when model results approached applicable thresholds.

Table 4 provides emissions quantities for criteria pollutants that were used in the modeling analyses. Annual modeling was not conducted for this modification because the annual throughput and corresponding emissions will not increase. Annual impacts from emissions increases associated with the new facers were assessed in the analyses conducted for the previous PTC .

No TAP emissions were identified for the applicable emissions units.

Table 4. Criteria Pollutant Emissions Rates Used for Modeling

Source (Id Code)	Maximum Hourly Emissions Rate Increase[a] (lb/hr)[b]			
Pollutant	PM_{10}[c]	SO_2[d]	NO_x[e]	CO[f]
Scrap Cyclone (CYCLN)	0.95	NA[g]	NA[g]	NA[g]
Starch Silo (SILO)	0.077	NA[g]	NA[g]	NA[g]
Boiler 1 (BOILER1)[h]	0.44	NA[g]	NA[g]	NA[g]
Boiler 2 (BOILER2)[h]	0.44	NA[g]	NA[g]	NA[g]
Corrugator vent 1A (CRV1A)	0.0095	NA[g]	NA[g]	NA[g]
Corrugator vent 1B (CRV1B)	0.0095	NA[g]	NA[g]	NA[g]
Corrugator vent 1A (CRV2A)	0.028	NA[g]	NA[g]	NA[g]
Corrugator vent 1A (CRV2B)	0.028	NA[g]	NA[g]	NA[g]

a. Emissions rate used for 24-hour, 8-hr, 3-hr, and 1-hr averaging periods
b. Pounds per hour
c. Particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers
d. Sulfur dioxide
e. Oxides of nitrogen
f. Carbon monoxide
g. Not modeled because PM_{10} was the only pollutant associated with the modification
h. Not included in the significant impact analysis because emissions from these units are not afected by the installation of the new facers

2.4.8 Emissions Release Parameters

Table 5 provides emissions release parameters. Modeling submitted by the applicant used a cyclone flow velocity of 0.5 m/sec. DEQ changed this value to 0.001 m/sec for the verification modeling to negate momentum-induced plume rise. Momentum-induced plume rise will not occur because the source vents in the horizontal direction. The roof vents were modeled by the applicant using a flow velocity of 16 m/sec. DEQ verification modeling was conducted using a conservatively low flow of 0.01 m/sec for these sources because it was uncertain whether these sources vent uninterrupted in the vertical direction and the estimated volumetric flow from each vent was not well justified.

Table 5. Emissions and Stack Parameters

Source / Location	Source Type	Stack Height (m)[a]	Stack Diameter (m)	Stack Gas Temp. (K)[b]	Stack Gas Flow Velocity (m/sec)
Scrap Cyclone (CYCLN)	Point	15.4	2.4	293	0.001[c]
Starch Silo (SILO)	Point	21.6	0.5	293	1.4
Boiler 1 (BOILER1)	Point	13.9	0.7	477	4.9
Boiler 2 (BOILER2)	Point	13.9	0.7	477	4.9
Corrugator vent 1A (CRV1A)	Point	12.2	1.0	293	0.01
Corrugator vent 1B (CRV1B)	Point	12.2	1.0	293	0.01
Corrugator vent 1A (CRV2A)	Point	12.2	1.0	293	0.01
Corrugator vent 1A (CRV2B)	Point	12.2	1.0	293	0.01

a. Meters
b. Kelvin
c. Horizontal release set at 0.001 to eliminate momentum induced buoyancy

3.0 MODELING RESULTS:

This Section describes dispersion modeling results from the significant impact analysis, the full impact analysis, and the TAP analysis.

3.1 Significant Impact Analysis Results

Modeled pollutant impacts to ambient air, obtained from the significant impact analysis, are provided in Table 6. PM_{10} is the only pollutant emitted as a result of the proposed modification. Annual impacts were not assessed in these analyses because Boise Cascade is not requesting a change to annual emissions limits, and annual impacts from emissions associated with the installation of the new facers on the corrugator were assessed during the previous permitting analyses.

The values reported in this memorandum were obtained from DEQ verification modeling. Results of the significant impact analysis indicate that a full ambient impact analysis is required, as per DEQ modeling guidance, because emissions from the proposed modification may result in impacts exceeding significant contribution levels.

Table 6. Significant Impact Analysis for Criteria Pollutants

Pollutant	Averaging Period	Ambient Impact ($\mu g/m^3$)[a]	Significant Contribution[b] ($\mu g/m^3$)	Full Impact Analysis Required (Y or N)
PM_{10}[c]	24-hour	51.9	5.0	Y
	Annual	NA[d]	1.0	N

a. Concentration in micrograms per cubic meter
b. Significant contribution level as per IDAPA 58.01.01.006.93
c. Particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers
d. Annual modeling was conducted during the previous PTC analyses. This modification to the PTC does not affect annual allowable emissions rates

3.2 Full Impact Analysis Results

A full impact analysis involves modeling facility-wide PM_{10} emissions (including emissions from the boilers) and adding an appropriate background concentration value to those results. Results of the PM_{10} 24-hour averaged full impact analysis are presented in Table 7 and are shown in Figure 2.

Table 7. Full Impact Analysis for Criteria Pollutants (Facility-wide Emissions).

Pollutant	Averaging Period	Ambient Impact. ($\mu g/m^3$)[a]	Background Conc. ($\mu g/m^3$)	Total Ambient Conc. ($\mu g/m^3$)	Regulatory Limit[b] ($\mu g/m^3$)	Percent of Limit
PM_{10}[c]	24-hour	61.0[d]	73	134	150	89

a. Concentration in micrograms per cubic meter
b. IDAPA 58.01.01.577 (NAAQS)
c. Particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers
d. The maximum 1st highest modeled value at any receptor was used rather than the maximum 6th highest value because only one year of meteorological data were used in the modeling analyses.

Table 8 show the individual PM_{10} concentration contributions of the scrap cyclone, the two boilers, and the corrugator roof vents.

Table 8. Source-Specific PM_{10} Contributions

Source / Pollutant	Averaging Period	Ambient Impact. ($\mu g/m^3$)[a]	Background Conc. ($\mu g/m^3$)	Total Ambient Conc. ($\mu g/m^3$)	Regulatory Limit[b] ($\mu g/m^3$)	Percent of Limit
Scrap Cyclone	24-hour	45.5[c]	73	118.5	150	79
Boilers	24-hour	20.0[c]	73	93	150	62
Roof Vents	24-hour	4.7[c]	73	77	150	52

a. Concentration in micrograms per cubic meter
b. IDAPA 58.01.01.577 (NAAQS)
c. Maximum 1st highest modeled value at any receptor

3.3 TAP Analysis Results

No TAP emissions were associated with the proposed modification.

4.0 CONCLUSION

All modeling results of criteria pollutants are below NAAQS.

Electronic copies of the modeling analysis are saved on disk. Table 9 provides a summary of the files used in the modeling analysis. The permitting engineer has reviewed this modeling memo to ensure consistency with the PTC and technical memorandum.

Table 9. Dispersion Modeling Files

Type of File	**Description**	**File Name**
Met data	Sept 2000 – August 2001	HEYBFINAdjust.MET
BEEST input files	24-hour PM_{10}, significant impact	BoisePaperNov11Sign.BST
	24-hour PM_{10}, full impact	BoisePaperNov11Full.BST
Each BST file has the following type of files associated with it:		
Input file for BPIP program		.PIP
BPIP output file		.TAB
Concise BPIP output file		.SUM
BEE-Line file containing direction specific building dimensions		.SO
ISCST3 input file for each pollutant		.DTA
ISCST3 output list file for each pollutant		.LST
User summary output file for each pollutant		.USF
Master graphics output file for each pollutant		.GRF
Some modeling files have the following type of graphics files associated with them:		
Surfer data file		.DAT
Surfer boundary file		.BLN
Surfer post file containing source locations		.TXT
Surfer plot file		.SRF

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Figure 1 - Boise Cascade - Burley Throughput Increase PTC

Modeling Receptor Grid, Buildings, and Emissions Sources

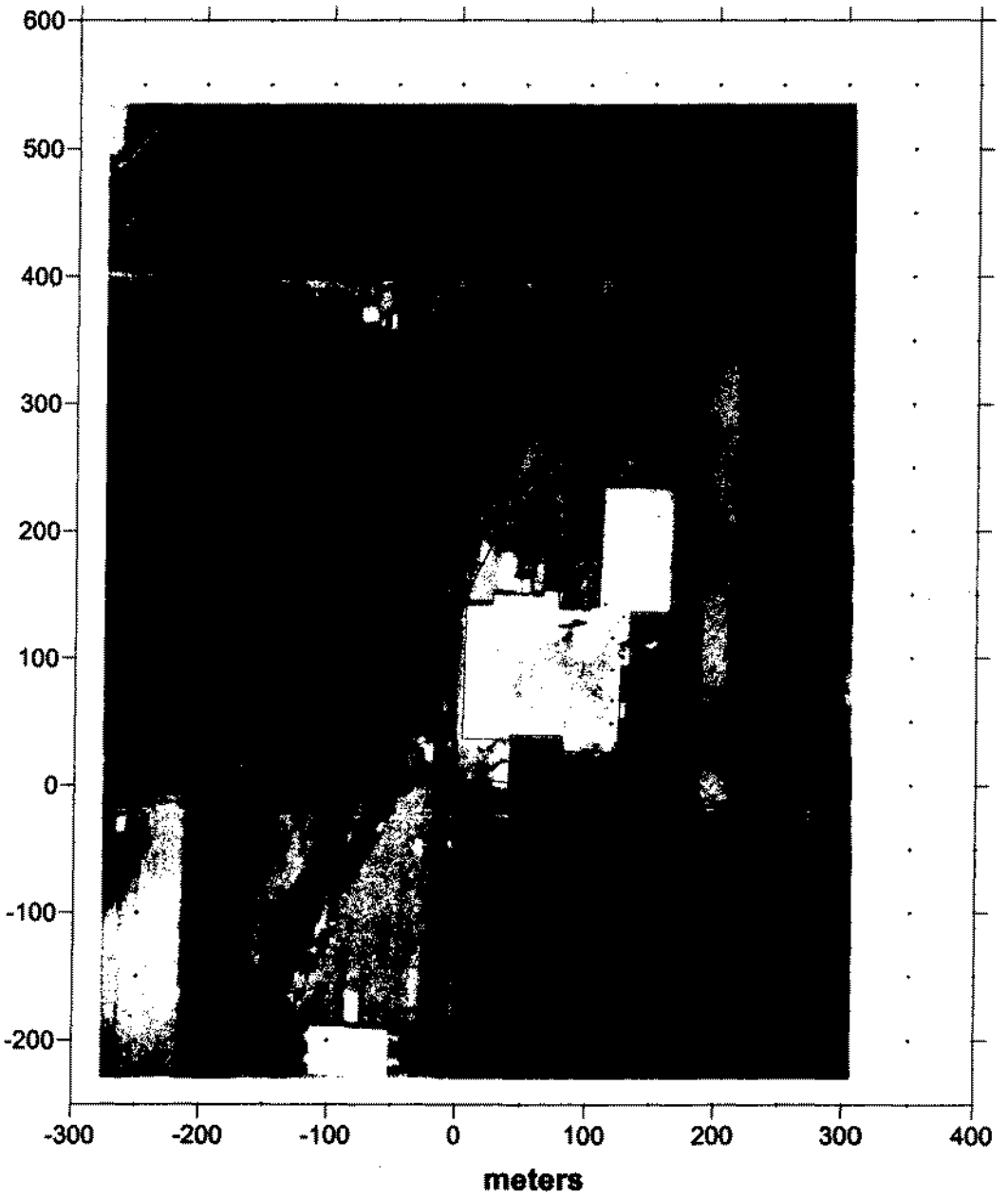
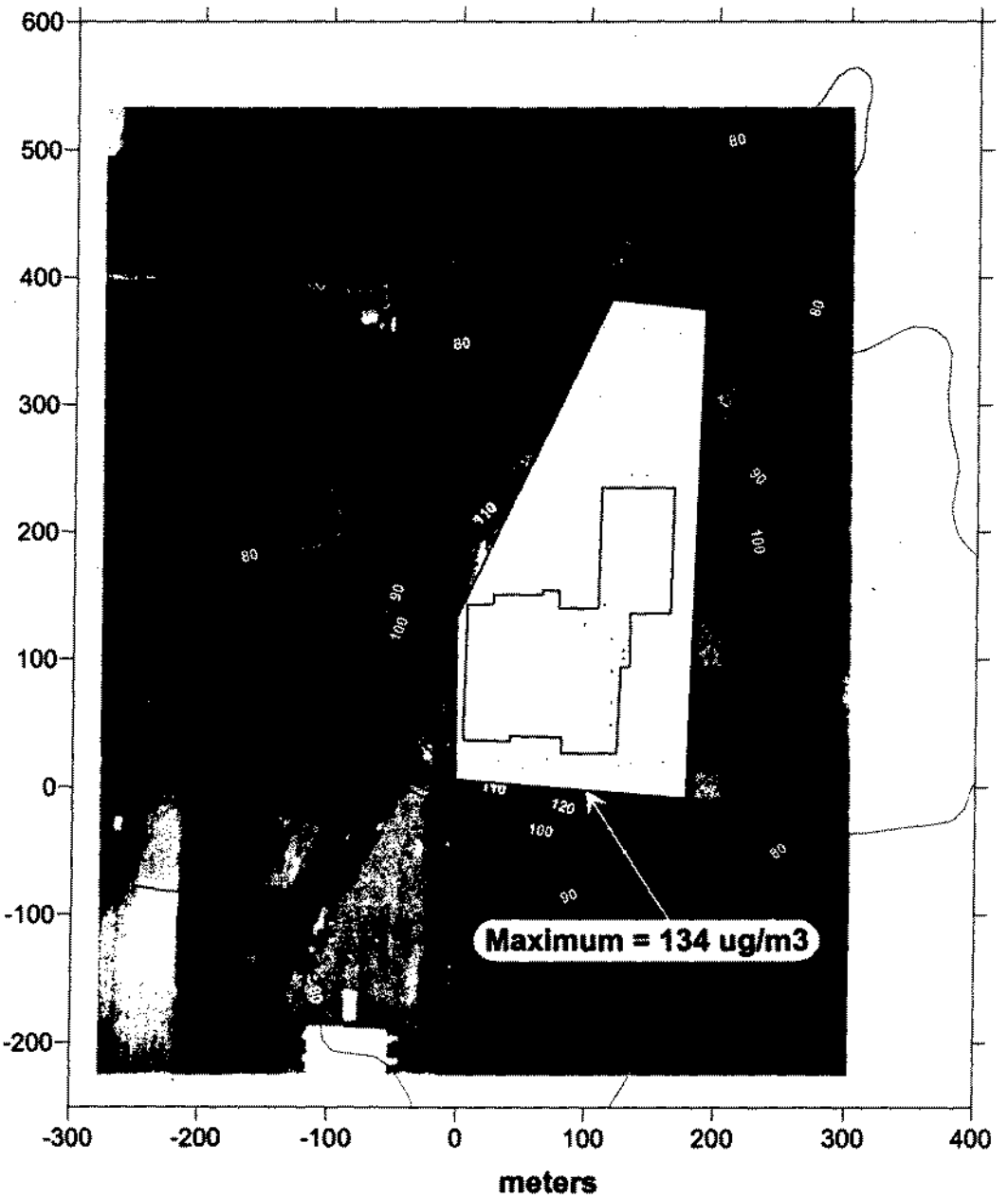


Figure 2 - Boise Cascade - Burley Throughput Increase PTC

6th Highest 24-Hour Averaged PM10 Concentrations (ug/m3)



APPENDIX B
Industrial Hygiene Sampling

Industrial Hygiene Survey

Burley

Container Division

Boise Cascade Corporation
1544 West 27th Street
Burley, Idaho 83318

January 25 and 26, 1999

Timothy J. Mann
Industrial Hygienist
Boise Cascade Corporation
P.O. Box 50
Boise, ID 83728
208/384-7711

Air Survey
Burley Container
January 25 and 26, 1999

Summary

On January 25 and 26, 1999, industrial hygiene monitoring for cellulose dust, volatile organic compounds, carbon monoxide, and formaldehyde was performed at the Burley Container facility. Although the results reveal levels below the OSHA permissible exposure limit (PEL) for the contaminants monitored, formaldehyde results have meet and exceeded the OSHA training level of 0.1 ppm and personal samples for carbon monoxide were above 50% of the PEL. The results of the monitoring are demonstrated in Tables 1 - 7.

Recommendations include formaldehyde training, posting and filing of this report, and tune-ups for industrial trucks.

Cellulose Dust: Table 1 lists the results of the monitoring for employee exposure to cellulose dust. Levels were below the OSHA PEL (Permissible Exposure Limit) of 15 mg/m^3 based upon an eight-hour time weighted average (8-hr. TWA).

Formaldehyde: Table 2 lists the results of the monitoring for employee exposure to formaldehyde. Levels at the time of monitoring were below the OSHA PEL of 0.75 ppm (8-hr. TWA). Levels at the time of monitoring did meet and exceed the training level for formaldehyde.

Volatile Organic Compounds: Tables 3 - 5 list the results of the monitoring for employee exposure to volatile organic compounds. Levels at the time of monitoring were below the OSHA PELs. Chloroform and o-Dichlorobenzene have OSHA 15 minute ceiling concentrations of 50 ppm. The American Conference of Governmental Industrial Hygienists have an 8-hour threshold limit value of 10 ppm for chloroform and 25 ppm for o-Dichlorobenzene. Ethyl Alcohol samples had possible breakthrough or migration.

Carbon Monoxide: Tables 6 - 7 list the results of the monitoring for carbon monoxide. Levels at the time of the monitoring were below the OSHA PEL of 50 ppm based upon an 8-hour TWA, but were above the ACGIH (American Conference of Governmental Industrial Hygienists) threshold limit value of 25 ppm.

METHODS

Cellulose Dust - NIOSH 0500

Samples were collected to evaluate the presence of cellulose dust. Samples were collected by drawing a known volume of air through a 5.0 micron preweighted P.V.C. filter. The air was drawn through the cassette filter with a SKC, Universal Sample pump model 224-PCXR7, calibrated at a flow rate of approximately 1 to 2 liters per minute. The pumps were calibrated before and after use. After the exposure time, the samples were capped and sent to Galson Laboratories in East Syracuse, New York, for analysis via NIOSH Method 0500. Galson Laboratories is an independent laboratory certified by the AIHA.

Formaldehyde TO-11

Samples for formaldehyde were collected using SKC tubes Part #226-119, Lot #762. Samples were collected for formaldehyde by drawing a known volume of air through a DNPH treated silica gel tube. The air was drawn through the tube with a SKC, Universal Sample pump model 224-PCXR7, calibrated at a flow rate of approximately 0.1- 1.0 liters per minute (lpm). The pumps were calibrated before and after use. After the exposure time, the samples were capped and sent to Galson Laboratories in East Syracuse, New York, for analysis via TO-11 method for formaldehyde. Galson Laboratories is an independent laboratory certified by the AIHA.

Volatile Organic Compounds - Various NIOSH Methods

Samples for organic vapors were collected using SKC tubes Part #226-01, Lot #2000. Samples were collected for organic vapors by drawing a known volume of air through a charcoal tube. The air was drawn through the tube with a SKC, Universal Sample pump model 224-PCXR7, calibrated at a flow rate of approximately 0.01- 0.2 liters per minute (lpm). The pumps were calibrated before and after use. After the exposure time, the samples were capped and sent to Galson Laboratories in East Syracuse, New York, for analysis via NIOSH methods for organic vapors. Galson Laboratories is an independent laboratory certified by the AIHA.

Carbon Monoxide - Drager Diffusion Tubes and Drager 190 Direct Reading

Samples were collected using Drager Carbon Monoxide diffusion tubes (Drager #67-33191) with an expiration date of January 2000. The tubes were activated and placed in the breathing zone of the employee or area being monitored. After completion of monitoring, the exposure time (hours) and the detector tube indication (ppm-hr) was recorded. The carbon monoxide concentration was then calculated by dividing the detector tube indication by the sample time. Possible interferences would include hydrogen sulfide, ammonia, sulfur dioxide, nitrogen dioxide, and n-butane.

Samples were collected with a Drager 190 direct reading instrument. The unit was calibrated according to the manufacturer's recommendation on January 25 and 26, 1999.

RECOMMENDATIONS

1. Please post these results of monitoring within 15 days of receipt of this report.
2. Maintain a copy of this survey in your safety and health files.
3. It is recommended that formaldehyde training be conducted, and it be consistent with the requirements of 1910.1048 n (See attached).
4. It is recommended that Hyster 11 and Caterpillar 12 be tuned to reduce the carbon monoxide emissions.

TABLE 1
CELLULOSE DUST RESULTS
Burley Container
January 25, 1999

Employee/Job	Sample #	Exposure Time (Minutes)	Sample Volume (l)	Results 8-hr TWA (mg/m^3)	OSHA PEL 8-hr TWA (mg/m^3)
Al Chapa/Scott McAlister 50 inch Flexo Operator	30107 30112	317 93	396.25 116.25	0.21 <0.4 TWA=0.25	15.0
Merlin Smedley /Domingo Rebollozo 38 inch Flexo Operator	30108 30120	322 95	396.06 114.95	<0.1 <0.4 TWA=<0.17	15.0
Area Sample - Baler	30111	405	514.35	0.16	15.0
Blank	30123	-	-	ND	15.0

Analytical Method: NIOSH 0500
Sample Media: 5.0 micron PW PVC Cassette Filters.
ND = Nondetectable.

TABLE 2
FORMALDEHYDE RESULTS
Burley Container
January 25, 1999

Employee/Job	Sample #	Exposure Time (Minutes)	Sample Volume (l)	Results 8-hour TWA (ppm)	OSHA PEL 8-hour TWA (ppm)
Area Sample Corrugator - Double Face Control Panel	F	439	158.48	0.2	0.75
Miguel Rementeria Corrugator - Single Face Operator	D	405	94.77	0.1	0.75
Ken Fowler Corrugator - Double Face Operator	B	410	90.61	0.1	0.75
Blank	Y	-	-	ND	0.75
Analytical Method: TO-11 **Sample Media: DNPH silica gel tubes** **ND = Nondetectable.**					
OSHA "Action Level" for medical monitoring: 0.50 ppm (8-hr TWA). OSHA "Training Level": 0.10 ppm (8-hr TWA).					

TABLE 3
VOLATILE ORGANICS RESULTS
Burley Container
January 25, 1999

Name	Miguel Rementeria Single Face Operator	Blank	OSHA PEL (8-hr TWA) ppm
Area	Corrugator	-	-
Sample #	C	X	-
Minutes Exposed	405	-	-
1,1,2-Trichloroethane	<0.01	ND	10
1,1,1-Trichloroethane	<0.01	ND	350
1,1-Dichloroethane	<0.02	ND	100
1,2-Dichloroethane	<0.01	ND	50
Acetone	0.04	ND	1000
Alpha-methylstyrene	<0.00	ND	50
Benzene	<0.00	ND	10
Carbon Tetrachloride	<0.04	ND	10
Cellosolve Acetate	<0.02	ND	100
Chlorobenzene	<0.00	ND	75
Chloroform	<0.03	ND	50©
Cyclohexane	<0.00	ND	300
Cyclohexanone	<0.02	ND	50
Cyclohexene	<0.00	ND	300
Ethyl Alcohol	>0.3	ND	1000
Ethyl Benzene	<0.00	ND	100
Isobutyl Alcohol	<0.02	ND	100
Isopropyl Alcohol	0.03	ND	400
m-Dichlorobenzene	<0.00	ND	N/A
Methyl Ethyl Ketone	<0.01	ND	200
Methyl Isobutyl Ketone	<0.00	ND	100
Methyl N-Propyl Ketone	<0.02	ND	200
N-Butyl Acetate	<0.00	ND	150
N-Butyl Alcohol	<0.03	ND	100
N-Hexane	<0.00	ND	500
N-Propyl Acetate	<0.01	ND	200
o-Dichlorobenzene	<0.00	ND	50©
Octane	<0.00	ND	500
p-Dichlorobenzene	<0.00	ND	75
p-Tert-Butyl Toluene	<0.00	ND	10
Tetrachloroethylene	<0.01	ND	100
Tetrahydrofuran	<0.01	ND	200
Toluene	<0.00	ND	200
Trichloroethylene	<0.01	ND	100
Vinyl Toluene	<0.01	ND	100
Xylene	<0.01	ND	100

Note: See summary section about ethyl alcohol, chloroform, & o-Dichlorobenzene.

TABLE 4
VOLATILE ORGANICS RESULTS
Burley Container
January 25, 1999

Name	Ken Fowler Double Face Operator	Blank	OSHA PEL (8-hr TWA) ppm
Area	Corrugator	-	-
Sample #	A	X	-
Minutes Exposed	410	-	-
1,1,2-Trichloroethane	<0.01	ND	10
1,1,1-Trichloroethane	<0.01	ND	350
1,1-Dichloroethane	<0.02	ND	100
1,2-Dichloroethane	<0.01	ND	50
Acetone	0.04	ND	1000
Alpha-methylstyrene	<0.00	ND	50
Benzene	<0.00	ND	10
Carbon Tetrachloride	<0.04	ND	10
Cellosolve Acetate	<0.02	ND	100
Chlorobenzene	<0.00	ND	75
Chloroform	<0.03	ND	50©
Cyclohexane	<0.00	ND	300
Cyclohexanone	<0.02	ND	50
Cyclohexene	<0.00	ND	300
Ethyl Alcohol	>0.5	ND	1000
Ethyl Benzene	<0.00	ND	100
Isobutyl Alcohol	<0.02	ND	100
Isopropyl Alcohol	0.05	ND	400
m-Dichlorobenzene	<0.00	ND	N/A
Methyl Ethyl Ketone	<0.01	ND	200
Methyl Isobutyl Ketone	<0.00	ND	100
Methyl N-Propyl Ketone	<0.01	ND	200
N-Butyl Acetate	<0.00	ND	150
N-Butyl Alcohol	<0.02	ND	100
N-Hexane	<0.00	ND	500
N-Propyl Acetate	<0.00	ND	200
o-Dichlorobenzene	<0.00	ND	50©
Octane	<0.00	ND	500
p-Dichlorobenzene	<0.00	ND	75
p-Tert-Butyl Toluene	<0.00	ND	10
Tetrachloroethylene	<0.01	ND	100
Tetrahydrofuran	<0.01	ND	200
Toluene	<0.00	ND	200
Trichloroethylene	<0.01	ND	100
Vinyl Toluene	<0.01	ND	100
Xylene	<0.01	ND	100

Note: See summary section about ethyl alcohol, chloroform, & o-Dichlorobenzene.

TABLE 5
VOLATILE ORGANICS RESULTS
Burley Container
January 25, 1999

Name	Area Sample Ladder at Double Face	Blank	OSHA PEL (8-hr TWA) ppm
Area	Corrugator	-	-
Sample #	E	X	-
Minutes Exposed	441	-	-
1,1,2-Trichloroethane	<0.02	ND	10
1,1,1-Trichloroethane	<0.02	ND	350
1,1-Dichloroethane	<0.02	ND	100
1,2-Dichloroethane	<0.02	ND	50
Acetone	0.03	ND	1000
Alpha-methylstyrene	<0.008	ND	50
Benzene	<0.01	ND	10
Carbon Tetrachloride	<0.06	ND	10
Cellosolve Acetate	<0.03	ND	100
Chlorobenzene	<0.009	ND	75
Chloroform	<0.04	ND	50©
Cyclohexane	<0.01	ND	300
Cyclohexanone	<0.02	ND	50
Cyclohexene	<0.01	ND	300
Ethyl Alcohol	>1.1	ND	1000
Ethyl Benzene	<0.009	ND	100
Isobutyl Alcohol	<0.03	ND	100
Isopropyl Alcohol	0.09	ND	400
m-Dichlorobenzene	<0.01	ND	N/A
Methyl Ethyl Ketone	<0.02	ND	200
Methyl Isobutyl Ketone	<0.01	ND	100
Methyl N-Propyl Ketone	<0.02	ND	200
N-Butyl Acetate	<0.01	ND	150
N-Butyl Alcohol	<0.04	ND	100
N-Hexane	<0.01	ND	500
N-Propyl Acetate	<0.01	ND	200
o-Dichlorobenzene	<0.01	ND	50©
Octane	<0.009	ND	500
p-Dichlorobenzene	<0.01	ND	75
p-Tert-Butyl Toluene	<0.007	ND	10
Tetrachloroethylene	<0.02	ND	100
Tetrahydrofuran	<0.02	ND	200
Toluene	<0.01	ND	200
Trichloroethylene	<0.02	ND	100
Vinyl Toluene	<0.02	ND	100
Xylene	<0.02	ND	100

Note: See summary section about ethyl alcohol, chloroform, & o-Dichlorobenzene.

TABLE 6
CARBON MONOXIDE RESULTS
Burley Container
January 25, 1999

Employee/Job	Sample I.D.	Exposure Time (Hours)	Carbon Monoxide Results (8-hr TWA) (ppm)	OSHA PEL (8-hr TWA) (ppm)
Kristie Johnson Roll Grab - Corrugator Hyster 11	KJ	406	44.12	50
Stan Allen Roll Grab - Warehouse Cat. 12	SA	392	38.28	50
Ron Robertson Forktruck #7- Shipping	RR	396	7.6	50
Jessie Stuart Forktruck #2- Shipping	JS	394	7.6	50

Sample Media — Drager Diffusion Tubes.
ND = Nondetectable.

TABLE 7
CARBON MONOXIDE RESULTS
Burley Container
January 25 and 26, 1999

Employee/Area	Concentration (ppm)
Kristie Johnson	30 (2 hour TWA)
Stan Allen	58 (4 hour TWA)
Backside corrugator by employee entrance	3
Dry end of corrugator	5
Double face of corrugator by ladder	10
Single face of corrugator by ladder	15
Baler	19
Shipping rails	10
Warehouse inside trailor	43
Warehouse main dock area	29 - 109
Entrance to warehouse	50
38 inch flexo	5
Hyster 11 exhaust	42
Cat. 12	330
Sample Media: Drager 190 Direct Reading Instrument	

Appendix A

Accuracy of Monitoring

Monitoring shall be accurate, at the 95 percent confidence level, to within plus or minus 25 percent for airborne concentrations of formaldehyde at the TWA and to within plus or minus 35 percent for airborne concentrations of formaldehyde at the action level.

Sample ID - Results taken from Table 2	Formaldehyde 8-hr. TWA (ppm)	TWA +/–25% Confidence (ppm)	TWA +/–35% Confidence (ppm)
F	0.2	(+/–0.05) 0.25/0.15	(+/–0.07) 0.27/0.13
B & D	0.1	(+/–0.025) 0.125/0.075	(+/–0.035) 0.135/0.065

Formaldehyde

1910.1048(n)

1. **Participation -** The employer shall assure that all employees who are assigned to workplaces where there is exposure to formaldehyde participate in a training program, except that where the employer can show, using objective data, that employees are not exposed to formaldehyde at or above 0.1 ppm, the employer is not required to provide training.

2. **Frequency -** Employers shall provide such information and training to employees at the time of initial assignment, and whenever a new exposure to formaldehyde is introduced into the work area. The training shall be repeated at least annually.

3. **Training Program -** The training program shall be conducted in a manner which the employee is able to understand and shall include:

   (i) A discussion of the contents of this regulation and the contents of the Material Safety Data Sheet.

   (ii) The purpose for and a description of the medical surveillance program required by this standard, including:

   (A) A description of the potential health hazards associated with exposure to formaldehyde and a description of the signs and symptoms of exposure to formaldehyde.

   (B) Instructions to immediately report to the employer the development of any adverse signs or symptoms that the employee suspects is attributable to formaldehyde exposure.

   (iii) Descriptions of operations in the work area where formaldehyde is present and an explanation of the safe work practices appropriate for limiting exposure to formaldehyde in each job;

   (iv) The purpose for , proper use of, and limitations of personal protective clothing and equipment:

   (v) Instructions for the handling of spills, emergencies, and clean-up procedures;

   (vi) An explanation of the importance of engineering and work practice controls for employee protection and any necessary instruction in the use of these controls; and

(vii) A review of the emergency procedures including the specific duties or assignments of each employee in the event of an emergency.

(4) **Access to Training Materials -**

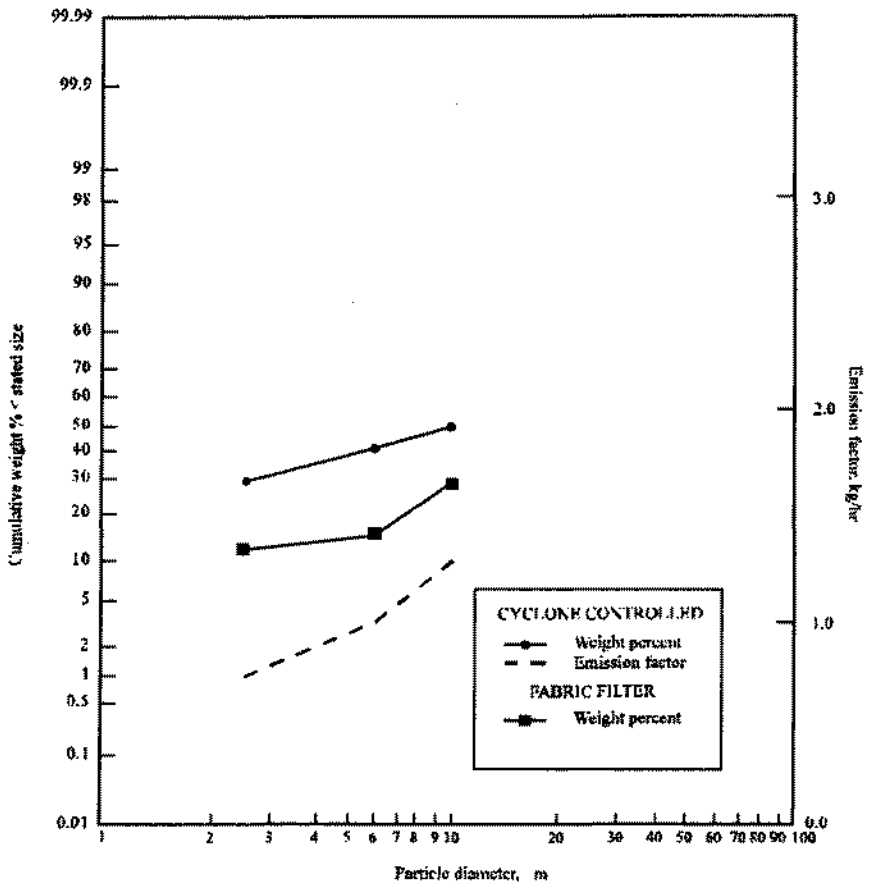
(i) The employer shall inform all affected employees of the location of written training materials and shall make these materials readily available, without cost, to the affected employees.

(ii) The employer shall provide, upon request, all training materials relating to the employee training program to the Assistant Secretary and the Director.

APPENDIX C
Particle Size Distribution

10.5 WOODWORKING WASTE COLLECTION OPERATIONS: BELT SANDER HOOD EXHAUST CYCLONE

10.5 WOODWORKING WASTE COLLECTION OPERATIONS:
BELT SANDER HOOD EXHAUST CYCLONE



Aerodynamic particle diameter, m	Cumulative wt. % < stated size		Emission factor, kg/hr of cyclone operation
	Cyclone	After cyclone and fabric filter	After cyclone collector
2.5	29.5	14.3	0.68
6.0	42.7	17.3	0.98
10.0	52.9	32.1	1.22