UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
AIR AND RADIATION DIVISION
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

MEMORANDUM

DATE: JUL 21 2014

SUBJECT: Clean Air Act Inspection of Dart Container, North Aurora, Illinois

FROM: Jeffrey Gahris, Environmental Engineer
Enforcement and Compliance Assurance Section (MI/WI)
Enforcement and Compliance Assurance Branch

THRU: Sarah Marshall, Chief
Enforcement and Compliance Assurance Section (MI/WI)
Enforcement and Compliance Assurance Branch

TO: File

Source name and location:
Dart Container Corporation of Illinois
310 South Evergreen Drive
North Aurora, Illinois 60542

NAICS codes: 326140, polystyrene foam products

General setting:
Dart Container Corporation of Illinois (Dart) operates a single-use expanded polystyrene beverage cup manufacturing plant in a mixed commercial and residential area of North Aurora, Illinois. Data presented by EJ SCREEN indicates that the neighborhood around the plant is an Environmental Justice community. The plant is located in Kane County, which is currently designated attainment/unclassifiable for all criteria pollutants.

Date of inspection: June 16, 2014

Attendees:
For Dart – Ron Haldeman, David Gossen, and Kathleen Kibler
For EPA – Jeffrey Gahris, Air Enforcement and Compliance Assurance Branch

Permit history:
Illinois EPA issued a Clean Air Act Permit Program (CAAPP) permit renewal to Dart on December 27, 1999. The permit contains emissions limits for volatile organic matter (VOM). It also requires tracking and recordkeeping for nitrogen oxides and hazardous air pollutants (HAPs). The permit expired on December 29, 2004, but has not yet been renewed. The permit describes the process as follows:

Emission Unit	Description	Date constructed
01	3 pre-expanders, 3 holding tanks, 2 blenders, 3 screeners, and molding machines	1972
	2 expanders, 2 screeners, and molding machines	1972-1979
	1 blender, 4 expanders, 4 screeners, mold machines	1979-1988
02	Boiler #1	1978
	Boiler #2	1967
	Boiler #3	1978
Fugitives	VOM equipment leaks, solvent leaks	

Emissions from the expanders, blenders, and holding tanks are captured and controlled by the boilers. Illinois also issued construction permits for the plant since the Title 5 permit was issued.

The permit contains the following emission limitations:

- Process VOM emissions – 25.8 tons/month and 207 tons/year.
- Polystyrene cup storage fugitive emissions – 33.28 tons/month and 266.2 tons/year.
- Polystyrene bead consumption – 1631 tons/month and 13,050 tons/year.

The permit also describes Dart's participation in the seasonal "cap and trade" market system for major sources located in the northeast Illinois nonattainment area for ground-level ozone. The permit contains specific requirements for the management of allotment trading units (ATUs).

Opening conference and overview of plant operations:
I arrived at the plant around 10:50 a.m. on June 16, 2014, and presented my credentials to the receptionist. I was greeted by Ron Haldeman, the plant manager. In the opening conference with Mr. Haldeman, David Gossen, and Kathleen Kibler, I described the nature and scope of the inspection.

Mr. Haldeman described the plant is a medium-sized Dart facility, operating 24 hours/day, five days/week. The plant has 250 employees.

Process steps consist of the following: Small polystyrene beads contain a little over 5 percent pentane by weight, and are made at Dart's Owensboro, Kentucky plant and shipped in plastic-lined Gaylord boxes. Dart adds steam heat to small polystyrene beads in the pre-expanders. The heated pentane causes the beads to expand to five times the previous size. They are then cooled in a storage tank for a number of hours while being agitated. Finally, the beads are reheated and injected into vacuum forming molds to fabricate disposal cups.

Pentane emissions occur during pre-expansion, but the processes is contained. Captured pentane gases are directed by pipes to four boilers that used for the process steam. The forming machines do not have emission controls. Finished products are stored in a warehouse where some additional fugitive pentane emissions occur. Dart's engineering department in Michigan had quantified the emissions. Dart recently purchased too many ATUs for this plant and had a balance of 3,650 ATUs at the beginning of the ozone season. Some ATUs were carried over to this reporting year, and for 2014, some ATUs will not be used and will be lost.

The inventory of finished products cycles through the warehouse within six weeks. At the end of 2013, inventory was turning over by 4.6 weeks, as verified by Ms. Kibler.

A fourth boiler was added in 2006. Boiler is subject to 40 C.F.R. Part 60, Subpart Dc. Each of the boilers have No. 2 fuel oil backup capability, but no fuel oil was burned in 2013. In 2012, Dart burned oil in order to empty the storage tank due to the oil's shelf-life. Dart tests the oil burners once every three years. The 10,000 gallon storage tank holds enough oil to operate the boilers for one and a half days.

In 2007, Dart added three pre-expanders. Dart representatives stated that this broadened the capabilities of the plant to produce various densities of product materials without expanding the plant's production capacity.

Dart uses steam and pressure to form the foam cups. The foam beads are fused together. Temperature and forming time are monitored to control product quality.

Dart also received polystyrene foam products (food containers and blocks of foam) for recycling. These materials are not used in the process to make cups, but rather, are densified and shipped by truck to recyclers who make non-food grade products.

The plant is shut down on Saturdays at 8 a.m., and restarted the following Monday at 8 a.m. Maintenance is performed on weekends. At startup on Monday mornings the boilers used are always running normally before the process starts because steam is needed to expand the foam

beads. Dart representatives claimed that there have been no emission control bypasses due to malfunctions.

Pam Dolbee of Dart's engineering office in Mason, Michigan, manages boiler efficiency testing. The boiler exhausts are not sampled for VOM emissions, but oxygen is analyzed. In Mr. Haldeman's view, the boilers combust pentane much like natural gas, so there is little effect on the natural gas emission factors.

Dart uses a pentane sensor to monitor the pentane concentration of collected pentane gas stream directed to the boilers. Dart calibrates the sensors monthly.

Plant walk-through and inspection:
We examined the pre-expanders where hot air is added. As the beads expand, they are directed pneumatically in one direction while the pentane released from the beads is pulled under vacuum to the boilers. Dart representatives stated that the plant maintains a two week inventory of pre-expanded beads, which arrive in plastic-lined Gaylord boxes. Only 10 of the 12 expanders are in use.

The pentane capture monitoring system is located indoors between the pre-expanders and the boiler room. Dart employees opened the control panel where the pentane sensor is located. Attachment 1, Photo 1. This is used to monitor concentrations of pentane in relation to the lower explosive levels and, air pressure and flow rates, and pounds of pentane sent to the boilers. Photos 2-4. Dart also maintains a control panel that shows the operating status of the capture system and the boilers. Photo 5.

In the boiler room I inspected the three older package boilers manufactured by Cleaver-Brooks. I noted economizers situated above the boiler and pentane pipes connected near the top of each boiler just below its economizers. Boilers 1 and 2 had illegible name plates, but I could verify that Boiler 3 was rated at 25 MMBtu/hour. The new boiler, Boiler 4, was arranged in a similar fashion, and had a nameplate capacity of 29 MMBtu/hour. Photo 6.

As we passed by the foam cup molding machines, I noted there were no provision for capturing pentane, which are treated as fugitive emissions.

Record Review and Closure:
We reviewed Dart's records. Dart reports a pentane content of 5.26 to 5.39 percent in the incoming beads. Dart did not report any emergency shutdowns for the pentane capture systems nor the boilers. The pentane monitor provides counter readings which are used to track and report the pounds of pentane delivered to the boilers. The counter readings are recorded at 7 a.m. each day.

The plant produces 7.5 to nine million cups per day. Some of them have designs printed on the outside of the cups using offset printers, as specified by Dart's customers. Dart uses low-VOC ultraviolet-cured inks containing less than one percent VOM.

Dart provided monthly emission report for the months of January through April, 2014. Attachment 2. The VOM emissions are reported to be just under 113 tons for these months, which at the reported emission rate is on track to be less than the 491 ton allowable for the year.

In conclusion, I mentioned that EPA does not make on-site compliance determinations, and advised that EPA may follow-up with a formal information request. I left the site around 1 p.m.

Attachments (2)

Attachments

1. Photographs taken during inspection
2. Records provided by Dart during inspection

Attachment 1

Dart Container Corporation, North Aurora, Illinois

Inspection Photographs Taken by Jeffrey Gahris with Samsung SPH-L710 Phone

June 16, 2014

Photo 1. Pentane sensor system with panel door open

Photo 2. Pentane sensor provides instantaneous concentration as a percentage of the lower explosive limit for pentane

Photo 3. Flow rate monitoring for the pentane capture system

Photo 4. Pentane counter readout and chart recorder

Photo 5. Pentane collection system status panel

Photo 6. Boiler 4 showing incoming pentane pipe and standard natural gas burner

Photo 1. Pentane sensor system with panel door open

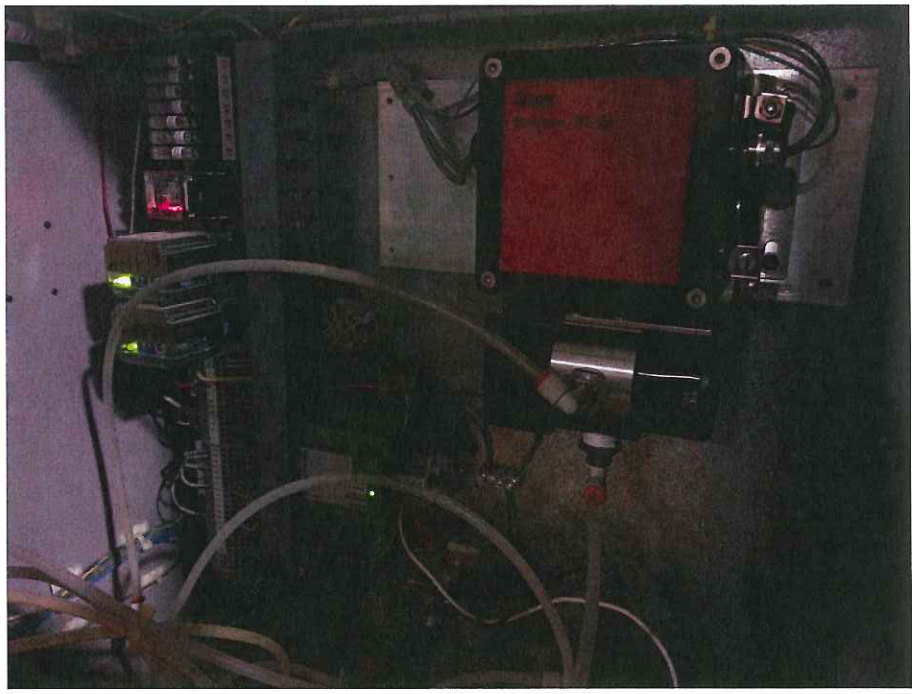

Photo 2. Pentane sensor provides instantaneous concentration as a percentage of the lower explosive limit for pentane

Photo 3. Flow rate monitoring for the pentane capture system

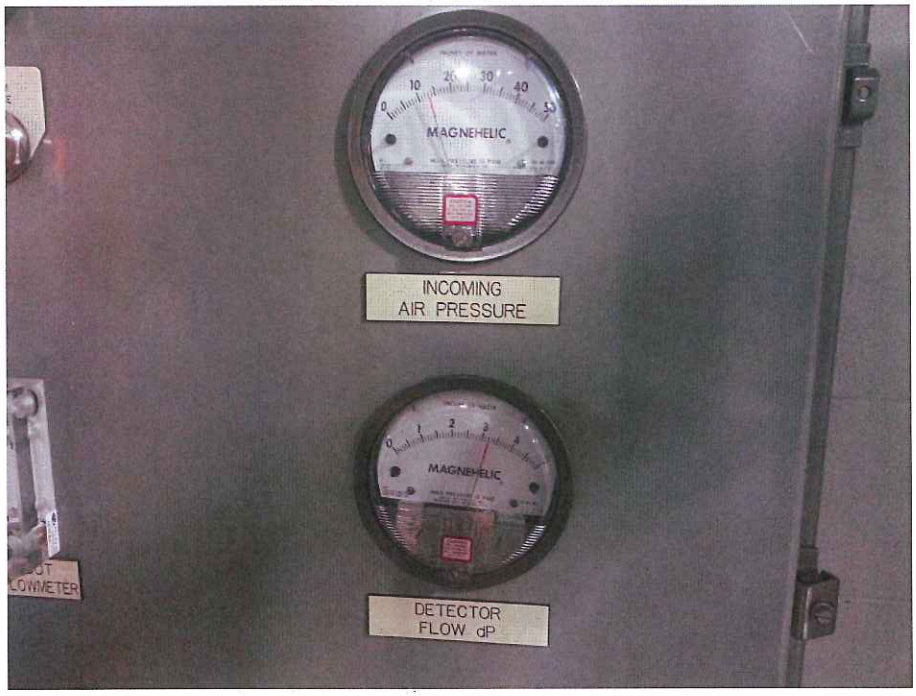

Photo 4. Pentane counter readout and chart recorder

Photo 5. Pentane collection system status panel

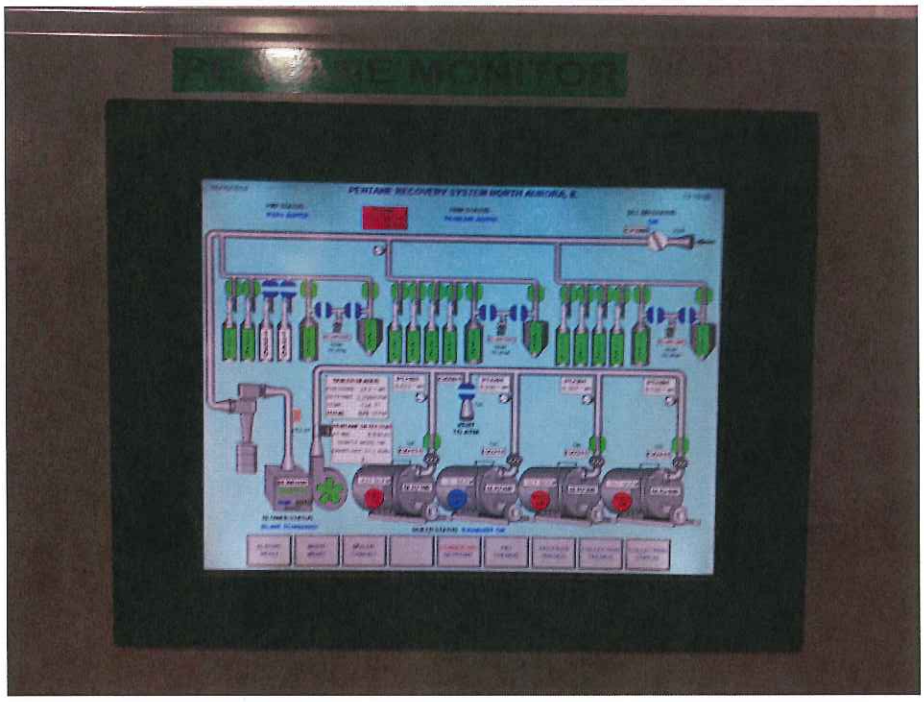

Photo 6. Boiler 4 showing incoming pentane pipe and standard natural gas burner

Standard bcc's: official file copy w/attachment(s)
originator's file copy w/attachment(s)
originating organization reading file w/attachment(s)

Other bcc's:

Creation Date:	July 15, 2014
Filename:	F:\Dart North Aurora Inspection Report.doc
Legend:	ARD:AECAB:AECAS (MI/WI): JGahris

Attachment 2

Records provided by Dart during inspection

DART CONTAINER CORPORATION of ILLINOIS
Monthly Emission Log

Year: 2014

Plant and Warehouse VOM

	January	February	March	April	May	June	July	August	September	October	November	December	Total	Ozone Season Total
Bead Used^	1326	1307	1531	1526									5690	0
VOM^	33813	33328.5	39040.5	38913									145095	0
Captured	10048	9169	8168	9417									36802	0
Destroyed	9997.76	9123.155	8127.16	9369.915									36617.99	0
Net VOM	23815.24	24205.345	30913.34	29543.085									108477.01	0
in Tons	11.91	12.10	15.46	14.77									54.24	0
Warehouse^	27050.4	26662.8	31232.4	31130.4									116076	0

Total Plant and Warehouse (tons): 112.276505
Allowable VOM from Plant and Warehouse: 473.2

Total VOM including boilers (tons): 112.939305
Allowable VOM including boilers: 491.21

Ozone Season Net VOM:~ 0
in ATUs: 0
Allowable ATUs: 3650

^ Bead units are 1000lb. VOM is 2.55% of Bead in lbs. Warehouse is 2.04% of bead in lbs.
~ Includes Boiler VOM

Boilers

	January	February	March	April	May	June	July	August	September	October	November	December	Total	Ozone Season Total			
															hrs	8760	3672
Gas*	19.31	19.56	22.15	21.83									82.85	0.00	mcf	hr	oS hr
#2 Oil*	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	1000 gallons		
Nox*	1.1586	1.1736	1.3290	1.3098									4.97	0.0000		1.134931507	0
CO*	1.4483	1.4670	1.6613	1.6373									6.21	0.0000		1.418664384	
PM*	0.0966	0.0978	0.1108	0.1092									0.41	0.0000		0.094577626	
SO2*	0.0097	0.0098	0.0111	0.0109									0.04	0.0000		0.009457763	
VOM*	0.1545	0.1565	0.1772	0.1746									0.66	0.0000		0.151324201	0
N20	0.0212	0.0215	0.0244	0.0240									0.09	0.0000		0.020807078	
lead	0.0000	0.0000	0.0000	0.0000									0.00	0.0000		4.72888E-06	
methane	0.0222	0.0225	0.0255	0.0251									0.10	0.0000		0.021752854	
PM10/PM2.5	0.0183	0.0186	0.0210	0.0207									0.08	0.0000		0.017969749	
CO2	1158.6000	1173.6000	1329.0000	1309.8000									4971.00	0.0000		1134.931507	
CO2E	1,165.65	1,180.74	1,337.09	1,317.77	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	5,001.25				

N20, lead, methane,and PM emission factors from AP-42; CO2 FO EF from Ill EPA

* Gas units are mmscf. Oil units are gallons. Emissions are calculated per the Title V Permit for units in tons.

AURORA EMISSIONS CONTROL SYSTEM STATUS LOG

OPERATORS LOG

DATE	TIME	OPER	PI-100	PI-200	PI-300	PI-400	PDI-400	TI-400	PDI-401	PI-1200	COUNTER	CHART RECORDER	# BOILERS	PENTANE WASTE WATER	% LEL
3/29/14	7:00	M.M.	0.788	0.009	0.567	0.311	1.5	113	29.8	2.581	533742	OK	2	0.4	**0.4**
4/1/14	7:00	P.B.	0.193	0.391	0.009	0.133	1.5	119	30.4	1.029	534008	OK	2	0.4	**9.1**
4/2/14	7:00	P.B.	2.121	0.009	1.585	0.415	1.5	114	19.5	4.89	534436	OK	2	0.4	**9.1**
4/3/14	7:00	P.B.	0.349	0.01	0.275	0.16	1.5	120	30.5	1.401	535111	OK	2	0.4	**7.8**
4/4/14	7:00	P.B.	0.147	0.009	0.129	..157	1	121	30.5	1.080	535332	OK	2	0.4	**8.6**
4/5/14	7:00	M.M.	1.282	0.009	0.653	0.283	1.5	111	27.6	2.952	535771	OK	2	0.4	**4.5**
4/8/14	7:00	P.B.	0.943	0.010	0.630	0.319	1	118	27.8	2.981	536142	OK	2	0.4	**6.8**
4/9/14	7:00	P.B.	0.816	0.009	0.605	0.277	1.5	118	28.1	2.837	536630	OK	2	0.4	**6.1**
4/10/14	7:00	P.B.	3.050	0.009	1.547	0.507	1.5	116	13.2	5.525	537097	OK	2	0.4	**4.1**
4/11/14	7:00	P.B.	0.930	0.009	0.637	0.297	1.5	115	26.7	2.889	537586	OK	2	0.4	**5.6**
4/12/14	7:00	P.B.	0.593	0.010	.3.94	0.299	1	116	29.8	1.893	538078	OK	2	0.4	**4.2**
4/15/14	7:00	P.B.	0.177	0.009	0.338	0.265	1.5	114	30.2	1.899	538401	OK	2	0.4	**6.3**
4/16/14	7:00	P.B.	0.527	0.009	0.269	0.242	1.5	115	30.5	1.2889	538860	OK	2	0.4	**1.8**
4/17/14	7:00	P.B.	0.411	0.009	0.169	0.162	0.5	115	30.5	1.199	539283	OK	2	0.4	**5.8**
4/18/14	7:00	D.L.	..437	0.009	0.154	0.242	1.5	115	30.5	1.069	539680	OK	2	0.4	**1.8**
4/19/14	7:00	D.L.	1.112	0.009	0.014	0.021	1.5	109	30.5	1.055	540141	OK	2	0.4	**0.2**
4/22/14	7:00	P.B.	0.969	0.009	0.014	0.003	1.5	120	30.5	1.636	540462	OK	2	0.4	**9.5**
4/23/14	7:00	P.B.	0.567	0.009	1.008	0.007	1.5	120	30.2	1.042	540884	OK	2	0.4	**13.2**
4/24/14	7:00	P.B.	1.702	0.009	0.749	0.007	1	119	30.4	2.043	541357	OK	2	0.4	**4.4**
4/25/14	7:00	P.B.	1.320	0.009	0.749	0.007	1	119	30.4	1.667	541847	OK	2	0.4	**6.3**
4/26/14	7:00	P.B.	0.712	0.009	0.747	0.803	1	111	30.4	1.165	542338	OK	2	0.4	**0.6**
4/29/14	7:00	P.B.	0.42	0.009	0.735	0.123	1.5	119	30.2	1.007	542685	OK	2	0.4	**5.4**
4/30/14	7:00	P.B.	0.418	0.009	0.65	0.12	1	117	30.4	1.0004	543159	OK	2	0.4	4.1
5/1/14	7:00	P.B.	1.329	0.01	0.728	0.236	1.5	119	24.3	3.362	543630	OK	2	0.4	5.9

Year: 2014

Plant and Warehouse VOM

	1st qtr%	2nd qtr%	3rd qtr%^	4th qtr%	Total	rate: lb./hr Year	rate: lb./hr Ozone	rate: tons/hr Year	rate: tons/hr Ozone
Bead Used^	73.2	26.8	0.0	0.0	5690	649.543379	0	0.328143022	0
VOM^					145095				
Captured					36802				
Destroyed					36617.99				
Net VOM					108477.01	12.3832203	0.00		
in Tons					54.24				
Warehouse^					116076	13.2506849	0.00		
Total Plant and Warehouse (tons):					112.276505				
Allowable VOM from Plant and Warehouse:					473.2				
Total VOM including boilers (tons):					112.939305				
Allowable VOM including boilers:					491.21				

Trucking Fuel

	1st qtr	2nd qtr	3rd qtr	4th qtr	ozone
	42043	42040	35035	42045	63061
	26.1	26.1	21.7	26.1	

	rate/hr	rate/hr
Fuel	0.0184	0.0286
Emmission	1.84E-14	2.856E-14

^ Bead units are 1000lb. VOM is 2.55% of Bead in lbs. Warehouse is 2.04% of bead in lbs.
~ Includes Boiler VOM

	1st qtr%	2nd qtr%	3rd qtr%^	4th qtr%	Boilers Total	gas rate/hr Year	gas rate/hr Ozone	oil rate/hr Year	oil rate/hr Ozone	factors per permit
Gas*	73.7	26.3	0.0	0.0	82.85	0.00945776	0			
#2 Oil*	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	0			0	0	
Nox*					4.971	1.13493151	0	0	0	35.45
CO*					6.21375	1.41866438		0		9.926
PM*					0.41425	0.09457763		0		3.545
SO2*					0.041425	0.00945776		0		73.027
VOM*					0.6628	0.1513242	0	0	0	3.545
N20					0.091135	0	0			
LEAD					2.07125E-05	0	0			
Methane					0.0952775	0.00907945	0			
PM10/PM2.5					0.0787075	0.01134932	0			
CO2					4971	0.00075662	0			
CO2 E										

* Gas units are mmscf. Oil units are gallons. Emissions are calculated per the Title V Permit for units in tons.

BOILER #4

5/13

BEC Boiler Equipment Company, LLC

205 Eisenhower Lane South, Lombard, IL 60148 * Ph# 630-627-4737 Fax# 630-627-4767

Combustion Analysis Report

Customer Name: Dart Container

Date: 5-2-13

Model: CB600-700

Fuel Type: Natural Gas

Unit: L-69405

	1	2	3	4	5	6	7	8	9	10	11	12
O2 %	9.0	7.0	5.8	4.7	4.3	3.6	3.7	3.5	3.4	3.4	3.5	3.5
CO ppm	35	4	1	1	1	1	1	2	1	1	2	2
Combustibles												
NOX ppm	58	90	106	105	106	121	123	124	122	122	124	123
Flue Temperature Deg. F.						353						353

Oil Burner Pressure												
Atomizing Air Pressure												
Oil Supply Pressure												

Model:

Fuel Type:

Unit:	1	2	3	4	5	6	7	8	9	10	11	12
O2 %												
CO ppm												
Combustibles												
NOX ppm												
Flue Temperature Deg. F.												

Oil Burner Pressure												
Atomizing Air Pressure												
Oil Supply Pressure												

Service Technician Tony Holmes **Customer Signature** X

CB600-700 / L-69405

100%

ECOM-AC Plus

Date	Time
05.02.13	07:30:08 AM

Gas analysis

Fuel type
Natural gas

T.Air	119	°F
T.Gas	98	°F
O2	3.5	%
CO	2	ppm
NO	120	ppm
NO2	3	ppm
NOx	123	ppm
CO2	9.8	%
Sen. temp.	74	°F

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50%

ECOM-AC Plus

Date	Time
05.02.13	07:35:54 AM

Gas analysis

Fuel type
Natural gas

T.Air	116	°F
T.Gas	101	°F
O2	4.0	%
CO	1	ppm
NO	110	ppm
NO2	3	ppm
NOx	113	ppm
CO2	9.5	%
Sen. temp.	75	°F

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Creation Date:	July 16, 2014
Filename:	F:\Dart North Aurora Inspection Report.doc
Legend:	ARD:AECAB:AECAS (MI/WI): JGahris