## New Venture Holdings, LLC

10230 North Holly Road
Grand Blanc, Michigan 48439

# Abatement System Study

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Prepared by
Comptech Corporation
November 8, 2005

# Abatement System Study

Prepared for
New Venture Holdings, LLC
Grand Blanc, Michigan

# Phase One
# Baseline Data Report

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# Abatement Study Overview

## Purpose

This abatement study is conducted to determine what corrective actions can be performed to reduce the cost of operating the systems at New Venture Holdings, LLC in Grand Blanc, Michigan.

First, our goal is to determine the total ***"volume of air delivered to the abatement system"*** and decide if any actions can be taken to reduce the operating costs. This is the first phase of the project, and the primary focus of this study.

Second, we must determine what actions can be taken to "***reduce the emissions and balance the system"***. The reduction of paint and solvent entering the abatement system will reduce maintenance cost and lower the emission of pollutants into the environment; this reduction may result in successful emission testing.

Finally, our goal is to determine what measures can be taken to ***"implement a long-term cost savings design"***.

## Description of Report

The following drawings and summary reports are collected data to determine the overall exhaust volumes for the spraybooths and ovens at the New Venture Holdings plant in Grand Blanc, Michigan. The data was gathered on or around November 1, 2005 and compiled thereafter. All booth and oven exhaust fan volumes were thoroughly tested to determine exhaust velocity, volumes, and fan static pressure.

## Description of Data

All booth and oven exhaust fans were tested to determine which, if any, are operating at a less than desirable condition. The results of these tests are summarized on each booth summary report and the accompanying drawings. Testing included exhaust volume, fan static pressure, motor current and voltage.

## Reference Drawings

Each booth and oven study is complete with a flow schematic drawing depicting the booth and oven layout as well as all air flow data.

# Instruments Used

The Following is a list of the instruments used in this study:

| | |
|---|---|
| Air Flow: | Airdata ADM-860 short ridge and pitot tube |
| Static pressure: | Airdata ADM-860 short ridge and pitot tube |
| Motor duty: | Sperry DSA-600 AC/DC clamp meter |
| Air Temperature: | Airdata ADM-860 short ridge and temperature probe |

# Abatement Summary

## Volume of Air Delivered to the Abatement System

Our testing focused primarily on the system fans that deliver air to abatement. We have determined the total operating air flow to the abatement system and compared that to the design data; each system is currently running below its design capacity. Since the systems are operating below design capacity, we can re-design the abatement system per the original design flow rates.

## Reduce Emissions and Balance the System

The following is our analysis of the data we collected during our testing. Since our primary focus in this phase was to determine a system baseline, further investigation and system balancing is required to correct these conditions.

- The oven exhaust fans are underperforming and are not operating per design; either the oven fresh air requirements are not being met (which is a code violation due to the LEL being exceeded) or the ovens are spilling excess air into the plant. In both cases, the problem should be corrected immediately.
- The Spraybooth exhaust fans are underperforming. In this case, either the air supply houses are also underperforming or the additional air is being spilled into the plant.
- The Spraybooth exhaust fans are operating at less than the design static pressure. This is due to both inadequate scrubbing at the booth scrubber. In some cases, the scrubbing is only half of the design and should be corrected immediately. Inadequate scrubbing is allowing an excessive amount of paint and solvent to enter the filter houses and overload the abatement system.
- The flash tunnel exhaust fans are either not operating or underperforming. This should be corrected since it contributes to the overall system balance.

## Implement a Long Term Cost Savings Design

We suggest converting the system(s) to a recirculation system; this modification will drastically reduce the operating costs. Since this is out of the scope of this study, further analysis and data gathering is required.

# Corrective Actions

## Volume of Air Delivered to the Abatement System

All systems are currently underperforming; the total exhaust volume from each line is inadequate. In order to correct these flow rates, the actions listed below should be taken. Once we have a balanced system, we can use the final data to re-engineer the abatement system which will allow us to shut down half of the Concentrators, one Filter House, and one Supply fan. These changes will reduce operating costs significantly.

## Reduce Emissions and Balance the System

In order to reduce emissions and Balance the System, further study and analysis is required. We propose to review the supply volumes to the operating systems (Line B and D) and balance the systems per the original design.

#### Review Oven Fresh Air and Exhaust

Measuring the fresh air into the ovens will allow us to decide if the Lower Explosive Limit required by IRI is being maintained. Further, it will help us understand the current oven balance and adjust the system dampers to achieve the optimum supply of fresh air and exhaust of contaminates.

#### Review the Supply Volumes to the Booths

Measuring the booth supply air volumes will help us understand the current system balance of the booths.

#### Review and Adjust Booth Scrubbers

Review line B and D booth scrubbers and adjust them as required to achieve the static pressure necessary to provide efficient paint and solvent removal. Inadequate scrubbing is allowing an excessive amount of paint and solvent to enter the filter houses and overload the abatement system; correcting this will lower maintenance costs and reduce emissions to the abatement system.

#### Balance the Booths

Provide a complete Booth Balance for Line B and D which will allow them to run in a balanced state without running Line A.

#### Balance the Ovens

Provide a complete Oven Balance for Line B and D which will allow them to run in a balanced state without running Line A. In addition to a balanced oven, we will re-engineer the oven Fresh Air requirements and exhaust volumes per zone to achieve a balanced system in accordance with IRI.

**Read all Booth and Oven Exhaust**
After the final booth and oven balance is complete, we will read all flow rates and report them on an updated set of "Final as is" flow schematics. This final data will then be used to re-engineer the abatement system.

# Implement a long-term cost savings design

The strategy we suggest is a long term investment with immediate short-term pay back. We recommend converting each active line over to a recirculation system. This will eliminate ninety percent of the booth exhaust and allow us to shut down the Abatement System – which is the basis of the short-term pay back.

This phase can be split into several smaller phases.

The first phase is to study the annual cost savings associated with a recirculation system. In this phase we will provide a report indicating the savings associated with converting Air Bag "D" Line and Fascia "B" Line together or independently. We will also study the feasibility of converting one system while maintaining the other systems on line.

The second phase is to provide a conceptual design of how the recirculation systems will work within the constraints of the existing plant. Also, we will provide a new plant layout showing flow through the new system (B, D, or A line).

The third phase is to provide a complete engineered package of a recirculation system complete with construction drawings and documents, scopes of work, and all phasing schedules indicating when and how each line will be converted.

# Fascia "A" Line Results

## Overview

Line "A" consists of Fascia "A" Booth, Prime "A" Booth, and Fascia "A" Oven. All systems were operational during our testing which consisted of motor amps and voltage, velocity and flow rates, and static pressures across the fans.

## Summary of Data

Fascia "A" Booth consists of seven exhaust fans A-EF(1) through A–EF(7); Prime "A" Booth consists of two fans PA-EF(1) and PA-EF(2). The exhaust from these two booths combines into a main trunk and goes to the Abatement System. The total booth exhaust of 117,080 CFM is below the design rate of 137,000 CFM. See "Abatement Summary" for implications of an underperforming system and "Corrective Actions" for a list of suggested corrections.

Fascia "A" Oven consists of two fans A-EF(8) and A-EF(9). The exhaust from Fascia "A" Oven combines with the remaining ovens in a main trunk and is directed to the Salem Incinerator. The oven exhaust of 3,680 CFM is below the design rate of 7,700 CFM. See "Abatement Summary" for implications of an underperforming system and "Corrective Actions" for a list of suggested corrections.

| Item | Tested Flow | Design Flow | Underperforming |
|---|---|---|---|
| Fascia "A" Booth | 86,600 ACFM | 104,600 ACFM | 18,000 ACFM |
| Prime "A" Booth | 30,480 ACFM | 32,400 ACFM | 1,920 ACFM |
| Total "A" Booths | 117,080 ACFM | 137,000 ACFM | 19,920 ACFM |
| Fascia "A" Oven | 3,680 SCFM | 7,700 SCFM | 4,020 SCFM |

The booth scrubbers are designed for 6½ to 7 inches of static pressure. This should result in a fan inlet static pressure of about 6 inches. A few of the fans are operating well below this and should be corrected; specifically, A-EF(1), A-EF(7), and both Prime fans. Low static pressure drop across the scrubber results in inadequate scrubbing which overloads the abatement system. See "Abatement Summary" for implications of an underperforming system and "Corrective Actions" for a list of suggested corrections.

## General Equipment Status

All exhaust fans were operating during our testing except for A-EF(4) which was shut off and fan belts removed. All other fans were operating and appeared to be in satisfactory condition.

# Fascia "B" Line Results

## Overview

Fascia "B" consists of Fascia "B" Booth, Prime "B" Booth, and Fascia "B" Oven. All systems were operational during our testing which consisted of motor amps and voltage, velocity and flow rates, and static pressures across the fans.

## Summary of Data

Fascia "B" Booth consists of seven exhaust fans B-EF(1) through B–EF(7); Prime "B" Booth consists of two fans PB-EF(1) and PB-EF(2). The exhaust from these two booths combines into a main trunk and goes to the Abatement System. The total booth exhaust of 110,090 CFM is below the design rate of 137,000 CFM. See "Abatement Summary" for implications of an underperforming system and "Corrective Actions" for a list of suggested corrections.

Fascia "B" Oven consists of six fans B-EF(8) through B-EF(13). The exhaust from Fascia "B" Oven combines with the remaining ovens in a main trunk and is directed to the Salem Incinerator. The oven exhaust of 4,840 CFM is below the design rate of 14,967 CFM. See "Abatement Summary" for implications of an underperforming system and "Corrective Actions" for a list of suggested corrections.

| Item | Tested Flow | Design Flow | Underperforming |
|---|---|---|---|
| Fascia "B" Booth | 80,740 ACFM | 104,600 ACFM | 23,860 ACFM |
| Prime "B" Booth | 29,350 ACFM | 32,400 ACFM | 3,050 ACFM |
| Total "B" Booths | 110,090 ACFM | 137,000 ACFM | 26,910 ACFM |
| Fascia "B" Oven | 4,840 SCFM | 14,967 SCFM | 10,127 SCFM |

The booth scrubbers are designed for 6½ to 7 inches of static pressure. This should result in a fan inlet static pressure of about 6 inches. A few of the fans are operating well below this and should be corrected; specifically, B-EF(3), B-EF(7), and both Prime fans. Low static pressure drop across the scrubber results in inadequate scrubbing which overloads the abatement system. See "Abatement Summary" for implications of an underperforming system and "Corrective Actions" for a list of suggested corrections.

## General Equipment Status

All exhaust fans were operating during our testing and most appeared to be in satisfactory condition; the exception is B-EF (3) which is crushed and rusted at the fan inlet

# Manual “C” Line Results

## Overview

The booth has seven exhaust fans currently shut down and no readings were taken. There is a blank-off in the main exhaust run to the abatement equipment that could be relocated to cut off the last two exhaust taps. The KCR units designed for this booth are also currently shut down and no readings were taken.

# Airbag "D" Line Results

## Overview

Airbag "D" consists of Airbag "D" Booth, and Airbag "D" Oven. All systems were operational during our testing which consisted of motor amps and voltage, velocity and flow rates, and static pressures across the fans.

## Summary of Data

Airbag "D" Booth consists of seven exhaust fans D-EF(1) through D–EF(7). The exhaust from this booth goes to the Abatement System. The total booth exhaust of 66,020 CFM is below the design rate of 93,400 CFM. See "Abatement Summary" for implications of an underperforming system and "Corrective Actions" for a list of suggested corrections.

Airbag "D" Oven consists of one fan D-EF(8). The exhaust from Airbag "D" Oven combines with the remaining ovens in a main trunk and is directed to the Salem Incinerator. The oven exhaust of 3,840 CFM is below the design rate of 4,077 CFM. See "Abatement Summary" for implications of an underperforming system and "Corrective Actions" for a list of suggested corrections.

| Item | Tested Flow | Design Flow | Underperforming |
|---|---|---|---|
| Airbag "D" Booth | 66,020 ACFM | 93,400 ACFM | 27,380 ACFM |
| Airbag "D" Oven | 3,840 SCFM | 4,077 SCFM | 237 SCFM |

The booth scrubbers are designed for 6½ to 7 inches of static pressure. This should result in a fan inlet static pressure of about 6 inches. A few of the fans are operating well below this and should be corrected; specifically, D-EF(1), D-EF(2), and D-EF(5). Low static pressure drop across the scrubber results in inadequate scrubbing which overloads the abatement system. See "Abatement Summary" for implications of an underperforming system and "Corrective Actions" for a list of suggested corrections.

## General Equipment Status

All exhaust fans were operating during our testing and appeared to be in satisfactory condition.