GOLDEN SPECIALTY

THE GOLD STANDARD FOR AIR TESTING

Air Quality Test Report

HAP and Particulate Matter Testing

Neucor, Inc

White Swan, Washington

Dryer Vent #1, Press Vent # 1, and Line Former # 1

MNSR Permit Number: R10TNSR00200; EU IDs: D1, P1, and LF1

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This report is supported by GOLDEN's Quality Assurance Manual. The information included in the report is authentic and accurate, and GOLDEN operated in conformance with ASTM D7036 to the best of our knowledge during this test program.

Certified by:

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EXECUTIVE SUMMARY

Golden Specialty, Inc.'s (GOLDEN) Northwest Regional Office was contracted by Neucor, Inc. (Neucor) to perform emissions testing at their wood products facility located in White Swain, Washington. Testing was conducted on October 25-27, 2016. GOLDEN performed compliance testing on the exhausts of Press Vent #1 (P1) East and West Vents, Dryer Vent #1 (D1), and Line Former #1 (LF1). The tests were conducted in accordance with all appropriate United States Environmental Protection Agency (USEPA) Methodologies, as well as all requirements outlined in USEPA Code of Federal Regulations, Title 40, Part 60 (40 CFR 60) and Neucor's MNSR Permit No. R10TNSR00200.

Testing on the source was performed for the determination of concentrations and mass emission rates of filterable and condensable particulate matter (FPM/CPM; reported as $PM_{2.5}$ and PM_{10}), opacity, and speciated and total hazardous air pollutants (HAPs). Testing on the Press Vent #1 East and West Vents consisted of three (3) 18-minute runs (opacity), three (3) 60-minute runs (HAPs), and three (3) 120-minute runs (FPM/$PM_{2.5}$/PM_{10}) on each vent performed in accordance with USEPA Methods 1, 2, 3A, 4, 5/202, 9, and NCASI Method 99.02. Testing on the Dryer Vent #1 and Line former #1 consisted of three (3) 60-minute runs (HAPs) on each source performed in accordance with USEPA Methods 1, 2, 3A, 4, and NCASI Method 99.02. Testing and analysis procedures used for this project are presented in the United States Environmental Protection Agency (USEPA) document Title 40, Code of Federal Regulations, Part 60 (40 CFR 60), Appendix A; the Quality Assurance Handbook for Air Pollution Measurement Systems, Volume III, Stationary Source Specific Methods, and on the USEPA Technology Transfer Network Emission Measurement Center (EPA-TTN-EMC) website, Test Methods Section (http://www.epa.gov/ttn/emc/). The methods are discussed in the Performance Test Procedures section of this report. Included in this test report are sections detailing the Test Program, including Executive Summary, Introduction, Test Results, Sampling Procedures, Source Information, and Sample Calculation Sections; with Appendices which include all calibrations, field data, calculated data, process data, and laboratory data.

Tables 1 and 2 are the summaries of the results for this test program.

Source Name	Methods Performed	Test Date(s)	Analyte, Units	*Three Run Total	Compliance Limit
Press Vent #1 (East & West Vents)	USEPA Methods 1, 2, 3A, 4, 5, 202 & NCASI 99.02	10/25 - 10/27/2016	FPM, lb/MSF	**0.58**	*0.2*
			FPM, tons/yr	**5.7**	*1.8*
			$PM_{2.5}$, lb/hr	**0.24**	*0.4*
			$PM_{2.5}$, lb/MSF	**0.63**	*0.72*
			$PM_{2.5}$, tons/yr	**6.14**	*3.4*
			PM_{10}, lb/MSF	**0.63**	*0.4*
			PM_{10}, tons/yr	**6.14**	*3.4*
			Total HAPs, lb/MSF	**< 0.027**	*0.3000*
			Formaldehyde, lb/MSF	**< 0.0180**	*0.3000*

**Sum of runs performed on both stacks.*

Table 1. Summary of Press Vent #1 Compliance Test Results

Source Name	Methods Performed	Test Date(s)	Analyte, Units	Three Run Average	Compliance Limit
Dryer Vent #1	USEPA Methods 1, 2, 3A, 4, & NCASI 99.02	10/26/2016	Total HAPs, lb/ODT	**< 0.055**	*0.2990*
			Formaldehyde, lb/ODT	**< 0.014**	*0.0200*
			Methanol, lb/ODT	**< 0.047**	*0.2790*
Line Former #1	USEPA Methods 1, 2, 3A, 4, & NCASI 99.02	10/26/2016	Total HAPs, lb/ODT	**< 0.010**	*0.1034*
			Formaldehyde, lb/ODT	**< 0.0020**	*0.0420*
			Methanol, lb/ODT	**< 0.010**	*0.0614*

Table 2. Summary of Dryer Vent #1 & Line Former #1 Compliance Test Results

INTRODUCTION

Purpose of Test

The objective of the program was to conduct compliance testing on the Press Vent #1, Dryer Vent #1 and Line Former #1. The units were tested to determine specific pollutants outlined in this report. Mr. Shamit Surathu was the onsite project manager, and was assisted by Mr. Jacob Amerman, Mr. Austin Keough, and Mr. John Hathaway. Mr. Ed Surdyk with Neucor coordinated the testing. All documents and data relating to this test program are presented in this report. No agency personnel were onsite during testing.

For this compliance test program, gas concentrations of oxygen (O_2) and carbon dioxide (CO_2) were measured with a reference method (RM) analyzer. The concentrations of O_2 and CO_2 were measured on a percent by volume, dry basis (%vd).

Exhaust gas flow rate was determined using USEPA Methods 1-4. O_2 and CO_2 were measured using USEPA Method 3A. The moisture content of the stack gas was measured using Method 4. Opacity observations were made in accordance with Method 9. Testing for FPM/CPM consisted of drawing a representative sample from the exhaust using USEPA Method 5/202 that employed an isokinetic sampling rate and a sample train. FPM and CPM samples were shipped to GOLDEN Specialty's Laboratory located in Deer Park, TX, and analyzed gravimetrically. Testing for HAPs consisted of drawing a representative sample from the exhaust using NCASI Method 99.02 that employed a sample train with standard size impingers. NCASI Method 99.02 samples were shipped to GOLDEN Specialty's Laboratory located in Deer Park, TX, and analyzed with a Gas Chromatograph (GC). Testing procedures are discussed in more detail in the test methods section. Examples of all calculations are presented in the Sample Calculation section of this report.

GOLDEN utilized a single sampling system for the performance of this Test Program. The sampling system (System One) was utilized for concentration measurements of O_2 and CO_2. All calculated reference method data is provided in Appendix E. Process data is provided in Appendix F. Laboratory results are presented in Appendix G. Measurement uncertainty associated with this testing is addressed by following the approved test methods and test plans. Additional information regarding the measurement uncertainty can be provided upon request. The test procedures employed for this test program are in accordance with the Test Plan for this project. Deviations from the Test Plan or published Reference Methods are contained in the Problems, Deviations and/or Exceptions section of this report.

Problems, Deviations and/or Exceptions

Although not a requirement of the Reference Methods, GOLDEN operates its instrumental test trailers utilizing redundant systems in accordance with SOP GSC-EF009. System Two is not currently installed therefore only System One was utilized for this test program.

The Test Plan for this test program indicated USEPA Method 320 would be performed for the HAPs measurement on each source. Due to a logistics issue, the instrument utilized for the Method 320 was available. This deviation was communicated via email to the EPA on October 18, 2016, and is provided in Appendix D.

During Run 2 of PM testing performed on Press Vent #1, Run 2 of the HAPs testing on Press Vent #1, and Run 1 of HAPs testing on the Line Former #1, unit upsets required testing to be paused. Testing resumed once the unit was operating at the required rates. These time periods are recorded on the Daily Project Log in Appendix D of the test report.

TEST RESULTS

Detailed results for the compliance testing performed on Press Vent #1, Dryer Vent #1, and Line Former #1 at the Neucor wood products facility are summarized below in Tables 3 through 12. All supporting calibration, field, and process data collected for this project are provided in the Appendices of this report.

GOLDEN SPECIALTY

Air Quality Test Report

Plant	Neucor, Inc	Address	White Swan, WA	Job #	160282
Location	Press Vent #1 (East Vent)	Personnel	SN/AK/JA/JH	Date	10/25 & 10/26/16

	Run Number	1	*2	3	Average
Date	Test Date	10/25/2016	10/25/2016	10/26/2016	
Start	Run Start Time	10:36	14:30	8:11	
	Run Finish Time	12:43	19:18	10:21	
	Net Traversing Points	24	24	24	
Θ	Net Run Time, min.	120	120	120	120.0
D_N	Nozzle Diameter, in.	0.3292	0.3292	0.3292	0.3292
C_p	Pitot Tube Coeficient	0.84	0.84	0.84	0.84
Y	Dry Gas Meter Calibration Factor	0.977	0.977	0.977	0.977
P_{Br}	Barometric Pressure, in. Hg	29.04	29.04	29.38	29.15
ΔH	Average orifice meter Differential, in. H_2O	1.81	1.73	1.80	1.78
V_m	Dry Gas Meter Volume Sampled, ft^3	94.581	91.236	93.444	93.087
t_m	Average Dry Gas Meter Temperature, °F	80.1	72.9	56.7	69.9
V_{mstd}	Dry Gas Meter Volume Sampled, dscf	88.083	86.094	92.022	88.733
V_{mstd}	Dry Gas Meter Volume Sampled, dscm	2.495	2.438	2.606	2.513
V_{lc}	Total Moisture Liquid collected, g	28	23.7	35.1	28.9
V_{wstd}	Volume of Water Vapor, scf	1.32	1.12	1.65	1.36
% H_2O	Moisture Content of Stack Gas, %	1.48	1.28	1.77	1.51
%CO_2	Carbon Dioxide, % vd	0.05	0.08	0.08	0.07
%O_2	Oxygen, % vd	20.98	21.01	20.95	20.98
M_d	Dry Molecular Weight, lb/lb-Mole	28.85	28.85	28.85	28.85
M_s	Wet Molecular weight, lb/lb-Mole	28.69	28.71	28.66	28.69
P_g	Flue Gas Static Pressure, in. H_2O	0.1	0.1	0.1	0.1
P_s	Absolute Flue Gas Pressure, in. Hg	29.05	29.05	29.39	29.16
t_s	Average Stack Gas Temperature, °F	85.8	88.0	84.5	86.1
$\sqrt{\Delta P_{avg}}$	Average Square-Root Velocity Head, in H_2O	0.401	0.392	0.399	0.397
V_s	Average Stack Gas Velocity, ft/sec	23.29	22.79	23.05	23.04
A_s	Stack Crossectional Area, ft^2	11.54	11.54	11.54	11.54
Q_{std}	Dry Volumetric Flow Rate, dry scfm	14,921	14,574	14,937	14,811
Q_{aw}	Actual Wet Volumetric Flue Gas Flow Rate, acfm	16,126	15,781	15,964	15,957
%I	Percent Isokinetic of Sampling Rate, %	96.1	96.1	100.2	97.5
VE	Visible Emissions, % Opacity	0.0	0.0	0.0	0.0
$MSF_{3/4}$	Thousand square feet of board quantity (based on 3/4" basis) per hour	2.07	2.01	2.19	2.09
PD	Production Limit, MSF/day	53.3	53.3	53.3	53.3
PD	Production Limit, MSF/yr	19,454.5	19,454.5	19,454.5	19,454.5
W_f	Filterable Particulate Matter, g	0.0050	0.0054	0.0082	0.0062
C_f	Filterable Particulate Concentration, gr/dscf	0.0009	0.0010	0.0014	0.0011
E_f	Filterable Particulate Emission Rate, lb/hr	0.11	0.12	0.18	0.14
E_f	Filterable Particulate Emission Rate, lb/MSF	0.054	0.060	0.080	0.065
E_f	Filterable Particulate Emission Rate, tons/yr	0.53	0.58	0.78	0.63
W_c	Condensable Particulate Matter, g	0.0011	0.0014	0.0012	0.0012
C_c	Condensable Particulate Concentration, gr/dscf	0.0002	0.0003	0.0002	0.0002
E_c	Condensable Particulate Emission Rate, lb/hr	0.025	0.031	0.026	0.027
E_c	Condensable Particulate Emission Rate, lb/MSF	0.012	0.016	0.012	0.013
E_c	Condensable Particulate Emission Rate, tons/yr	0.12	0.15	0.11	0.13
W_t	Total Particulate Matter, g	0.0061	0.0068	0.0094	0.0074
C_t	Total Particulate Concentration, gr/dscf	0.0011	0.0012	0.0016	0.0013
E_t	Total Particulate Emission Rate, lb/hr	0.14	0.15	0.20	0.16
E_t	Total Particulate Emission Rate, lb/MSF	0.066	0.076	0.092	0.078
E_t	Total Particulate Emission Rate, tons/yr	0.65	0.74	0.89	0.76

**Run paused due to unit upset. See the Problems, Deviations, and/or Exceptions section.*

Table 3. Press Vent #1 East Vent Method 5/202 & 9 Test Results – October 25 & 26, 2016

GOLDEN SPECIALTY

Air Quality Test Report

Plant	Neucor, Inc	Address	White Swan, WA	Job #	160282
Location	Press Vent #1 (West Vent)	Personnel	SN/AK/JA/JH	Date	10/25 & 10/26/16

	Run Number	1	*2	3	Average
Date	Test Date	10/25/2016	10/25/2016	10/26/2016	
Start	Run Start Time	10:36	14:30	8:11	
	Run Finish Time	12:43	19:18	10:21	
	Net Traversing Points	24	24	24	
Θ	Net Run Time, min.	120	120	120	120.0
D_N	Nozzle Diameter, in.	0.3235	0.3235	0.3235	0.3235
C_p	Pitot Tube Coeficient	0.84	0.84	0.84	0.84
Y	Dry Gas Meter Calibration Factor	1.010	1.010	1.010	1.010
P_{Br}	Barometric Pressure, in. Hg	29.04	29.04	29.38	29.15
ΔH	Average orifice meter Differential, in. H_2O	2.40	2.28	2.25	2.31
V_m	Dry Gas Meter Volume Sampled, ft^3	106.314	106.528	104.015	105.619
t_m	Average Dry Gas Meter Temperature, °F	71.4	64.5	57.7	64.5
V_{mstd}	Dry Gas Meter Volume Sampled, dscf	104.174	105.742	105.802	105.239
V_{mstd}	Dry Gas Meter Volume Sampled, dscm	2.950	2.995	2.996	2.980
V_{lc}	Total Moisture Liquid collected, g	38	33.7	45.2	39.0
V_{wstd}	Volume of Water Vapor, scf	1.79	1.59	2.13	1.84
% H_2O	Moisture Content of Stack Gas, %	1.69	1.48	1.97	1.72
%CO_2	Carbon Dioxide, % vd	0.05	0.08	0.08	0.07
%O_2	Oxygen, % vd	20.98	21.01	20.95	20.98
M_d	Dry Molecular Weight, lb/lb-Mole	28.85	28.85	28.85	28.85
M_s	Wet Molecular weight, lb/lb-Mole	28.66	28.69	28.64	28.66
P_g	Flue Gas Static Pressure, in. H_2O	0.1	0.1	0.1	0.1
P_s	Absolute Flue Gas Pressure, in. Hg	29.05	29.05	29.39	29.16
t_s	Average Stack Gas Temperature, °F	86.3	87.8	84.1	86.0
$\sqrt{\Delta P_{avg}}$	Average Square-Root Velocity Head, in H_2O	0.485	0.478	0.474	0.479
V_s	Average Stack Gas Velocity, ft/sec	28.19	27.81	27.39	27.80
A_s	Stack Crossectional Area, ft^2	11.54	11.54	11.54	11.54
Q_{std}	Dry Volumetric Flow Rate, dry scfm	18,011	17,758	17,719	17,829
Q_{aw}	Actual Wet Volumetric Flue Gas Flow Rate, acfm	19,524	19,260	18,966	19,250
%I	Percent Isokinetic of Sampling Rate, %	97.5	100.3	100.6	99.5
VE	Visible Emissions, % Opacity	0.0	0.0	0.0	0.0
$MSF_{3/4}$	Thousand square feet of board quantity (based on 3/4" basis) per hour	2.07	2.01	2.19	2.09
PD	Production Limit, MSF/day	53.3	53.3	53.3	53.3
PD	Production Limit, MSF/yr	19,454.5	19,454.5	19,454.5	19,454.5
W_f	Filterable Particulate Matter, g	0.0598	0.0370	0.0474	0.0481
C_f	Filterable Particulate Concentration, gr/dscf	0.0089	0.0054	0.0069	0.0071
E_f	Filterable Particulate Emission Rate, lb/hr	1.37	0.82	1.05	1.08
E_f	Filterable Particulate Emission Rate, lb/MSF	0.66	0.41	0.48	0.52
E_f	Filterable Particulate Emission Rate, tons/yr	6.43	3.98	4.66	5.02
W_c	Condensable Particulate Matter, g	0.0033	0.0043	0.0026	0.0034
C_c	Condensable Particulate Concentration, gr/dscf	0.0005	0.0006	0.0004	0.0005
E_c	Condensable Particulate Emission Rate, lb/hr	0.075	0.096	0.058	0.076
E_c	Condensable Particulate Emission Rate, lb/MSF	0.037	0.048	0.026	0.037
E_c	Condensable Particulate Emission Rate, tons/yr	0.36	0.46	0.26	0.36
W_t	Total Particulate Matter, g	0.0631	0.0413	0.0500	0.0515
C_t	Total Particulate Concentration, gr/dscf	0.0093	0.0060	0.0073	0.0076
E_t	Total Particulate Emission Rate, lb/hr	1.44	0.92	1.11	1.16
E_t	Total Particulate Emission Rate, lb/MSF	0.70	0.46	0.51	0.55
E_t	Total Particulate Emission Rate, tons/yr	6.79	4.44	4.91	5.38

**Run paused due to unit upset. See the Problems, Deviations, and/or Exceptions section.*

Table 4. Press Vent #1 West Vent Method 5/202 & 9 Test Results – October 25 & 26, 2016

GOLDEN SPECIALTY

Air Quality Test Report

Plant	Neucor, Inc.	Address	White Swan, WA	Job #	160282
Location	Press Vent #1 (East Vent)	Personnel	SN/AK/JA/JH	Date	10/26/2016

	Run Number	1	*2	3	Average
Date	Test Date	10/26/2016	10/26/2016	10/26/2016	
Start	Run Start Time	12:25	14:30	16:28	
	Run Finish Time	13:25	15:47	17:28	
Θ	Net Run Time, min.	60	60	60	60.0
C_p	Pitot Tube Coeficient	0.84	0.84	0.84	0.84
Y	Dry Gas Meter Calibration Factor	0.977	0.977	0.977	0.977
P_{Br}	Barometric Pressure, in. Hg	29.38	29.38	29.38	29.38
ΔH	Average orifice meter Differential, inches H_2O	1.50	1.50	1.50	1.50
V_m	Dry Gas Meter Volume Sampled, ft^3	42.359	42.271	42.570	42.400
t_m	Average Dry Gas Meter Temperature, °F	53.6	62.8	66.8	61.0
V_{mstd}	Dry Gas Meter Volume Sampled, dscf	41.935	41.114	41.091	41.380
V_{mstd}	Dry Gas Meter Volume Sampled, dscm	1.188	1.164	1.164	1.172
V_{lc}	Total Moisture Liquid collected, g	14.6	13.6	14.6	14.3
V_{wstd}	Volume of Water Vapor, scf	0.69	0.64	0.69	0.67
% H_2O	Moisture Content of Stack Gas, %	1.62	1.54	1.65	1.60
%CO_2	Carbon Dioxide, % vd	0.03	0.04	0.05	0.04
%O_2	Oxygen, % vd	20.95	20.94	20.94	20.94
M_d	Dry Molecular Weight, lb/lb-Mole	28.84	28.84	28.84	28.84
M_s	Wet Molecular weight, lb/lb-Mole	28.67	28.68	28.67	28.67
P_g	Flue Gas Static Pressure, in. H_2O	0.10	0.10	0.10	0.10
P_s	Absolute Flue Gas Pressure, in. Hg	29.39	29.39	29.39	29.39
t_s	Average Stack Gas Temperature, °F	85.9	86.8	86.9	86.5
$\sqrt{\Delta P_{avg}}$	Average Square-Root Velocity Head, in H_2O	0.416	0.406	0.409	0.410
v_s	Average Stack Gas Velocity, ft/sec	24.05	23.48	23.68	23.73
A_s	Stack Crossectional Area, ft^2	11.54	11.54	11.54	11.54
Q_{sd}	Dry Volumetric Flow Rate, dry scfm	15,565	15,183	15,289	15,346
Q_{aw}	Actual Wet Volumetric Flue Gas Flow Rate, acfm	16,654	16,257	16,394	16,435
$MSF_{3/4}$	Thousand square feet of board quantity (based on 3/4" basis) per hour	5.14	3.22	3.33	3.90
NCASI 99.02 Sampling Data					
t_m	Average Dry Gas Meter Temperature, °F	56.67	64.67	67.50	62.94
V_m	Gas Meter Volume Sampled, L	24.267	24.021	23.940	24.076
V_{mstd}	Dry Standard Gas Meter Volume Sampled, dscm	0.024	0.024	0.024	0.024
$C_2H_4O_{\mu g/mL}$	Acetaldehyde Concentration in the Sample, µg/mL	< 0.25	< 0.25	< 0.25	< 0.25
Vol.	Volume of Sample Collected, mL	61	67	73	67
$C_2H_4O_{\mu g}$	Total Mass of Acetaldehyde in the Sample, µg	< 15.3	< 16.8	< 18.3	< 16.8
$C_2H_4O_{mg}$	Total Mass of Acetaldehyde in the Sample, mg	< 0.015	< 0.017	< 0.018	< 0.017
$C_2H_4O_{mg/dscm}$	Acetaldehyde Concentration in Air, mg/dscm	< 0.63	< 0.70	< 0.76	< 0.70
$C_2H_4O_{ppmvd}$	Acetaldehyde Concentration, ppmvd	< 0.34	< 0.38	< 0.42	< 0.38
$C_2H_4O_{lb/hr}$	Acetaldehyde Emission Rate, lb/hr	< 0.037	< 0.040	< 0.044	< 0.040
$C_3H_6O_{\mu g/mL}$	Propionaldehyde Concentration in the Sample, µg/mL	< 0.25	< 0.25	< 0.25	< 0.25
Vol.	Volume of Sample Collected, mL	61	67	73	67
$C_3H_6O_{\mu g}$	Total Mass of Propionaldehyde in the Sample, µg	< 15.3	< 16.8	< 18.3	< 16.8
$C_3H_6O_{mg}$	Total Mass of Propionaldehyde in the Sample, mg	< 0.015	< 0.017	< 0.018	< 0.017
$C_3H_6O_{mg/dscm}$	Propionaldehyde Concentration in Air, mg/dscm	< 0.63	< 0.70	< 0.76	< 0.70
$C_3H_6O_{ppmvd}$	Propionaldehyde Concentration, ppmvd	< 0.26	< 0.29	< 0.32	< 0.29
$C_3H_6O_{lb/hr}$	Propionaldehyde Emission Rate, lb/hr	< 0.037	< 0.040	< 0.044	< 0.040
$CH_4O_{\mu g/mL}$	Methanol Concentration in the Sample, µg/mL	< 0.25	< 0.25	< 0.25	< 0.25
Vol.	Volume of Sample Collected, mL	61	67	73	67
$CH_4O_{\mu g}$	Total Mass of Methanol in the Sample, µg	< 15.3	< 16.8	< 18.3	< 16.8
CH_4O_{mg}	Total Mass of Methanol in the Sample, mg	< 0.015	< 0.017	< 0.018	< 0.017
$CH_4O_{mg/dscm}$	Methanol Concentration in Air, mg/dscm	< 0.63	< 0.70	< 0.76	< 0.70
CH_4O_{ppmvd}	Methanol Concentration, ppmvd	< 0.47	< 0.52	< 0.57	< 0.52
$CH_4O_{lb/hr}$	Methanol Emission Rate, lb/hr	< 0.037	< 0.040	< 0.044	< 0.040

**Run paused due to unit upset. See the Problems, Deviations, and/or Exceptions section.*
For results below the reporting limit, half the reporting limit was used in the calculations.

Table 5. Press Vent #1 East Vent NCASI Method 99.02 Test Results – October 26, 2016 – Part 1

GOLDEN SPECIALTY

Air Quality Test Report

Plant	Neucor, Inc.	Address	White Swan, WA	Job #	160282
Location	Press Vent #1 (East Vent)	Personnel	SN/AK/JA/JH	Date	10/26/2016

	Run Number	1	*2	3	Average
Date	Test Date	10/26/2016	10/26/2016	10/26/2016	
Start	Run Start Time	12:25	14:30	16:28	
	Run Finish Time	13:25	15:47	17:28	
Θ	Net Run Time, min.	60	60	60	60.0
C_p	Pitot Tube Coeficient	0.84	0.84	0.84	0.84
Y	Dry Gas Meter Calibration Factor	0.977	0.977	0.977	0.977
P_{Br}	Barometric Pressure, in. Hg	29.38	29.38	29.38	29.38
ΔH	Average orifice meter Differential, inches H_2O	1.50	1.50	1.50	1.50
V_m	Dry Gas Meter Volume Sampled, ft^3	42.359	42.271	42.570	42.400
t_m	Average Dry Gas Meter Temperature, °F	53.6	62.8	66.8	61.0
V_{mstd}	Dry Gas Meter Volume Sampled, dscf	41.935	41.114	41.091	41.380
V_{mstd}	Dry Gas Meter Volume Sampled, dscm	1.188	1.164	1.164	1.172
V_{lc}	Total Moisture Liquid collected, g	14.6	13.6	14.6	14.3
V_{wstd}	Volume of Water Vapor, scf	0.69	0.64	0.69	0.67
% H_2O	Moisture Content of Stack Gas, %	1.62	1.54	1.65	1.60
%CO_2	Carbon Dioxide, % vd	0.03	0.04	0.05	0.04
%O_2	Oxygen, % vd	20.95	20.94	20.94	20.94
M_d	Dry Molecular Weight, lb/lb-Mole	28.84	28.84	28.84	28.84
M_s	Wet Molecular weight, lb/lb-Mole	28.67	28.68	28.67	28.67
P_g	Flue Gas Static Pressure, in. H_2O	0.10	0.10	0.10	0.10
P_s	Absolute Flue Gas Pressure, in. Hg	29.39	29.39	29.39	29.39
t_s	Average Stack Gas Temperature, °F	85.9	86.8	86.9	86.5
$\sqrt{\Delta P_{avg}}$	Average Square-Root Velocity Head, in H_2O	0.416	0.406	0.409	0.410
v_s	Average Stack Gas Velocity, ft/sec	24.05	23.48	23.68	23.73
A_s	Stack Crossectional Area, ft^2	11.54	11.54	11.54	11.54
Q_{sd}	Dry Volumetric Flow Rate, dry scfm	15,565	15,183	15,289	15,346
Q_{aw}	Actual Wet Volumetric Flue Gas Flow Rate, acfm	16,654	16,257	16,394	16,435
$MSF_{3/4}$	Thousand square feet of board quantity (based on 3/4" basis) per hour	5.14	3.22	3.33	3.90
NCASI 99.02 Sampling Data					
t_m	Average Dry Gas Meter Temperature, °F	56.67	64.67	67.50	62.94
V_m	Gas Meter Volume Sampled, L	24.267	24.021	23.940	24.076
V_{mstd}	Dry Standard Gas Meter Volume Sampled, dscm	0.024	0.024	0.024	0.024
$C_3H_4O_{\mu g/mL}$	Acrolein Concentration in the Sample, µg/mL	< 0.25	< 0.25	< 0.25	< 0.25
Vol.	Volume of Sample Collected, mL	61	67	73	67
$C_3H_4O_{\mu g}$	Total Mass of Acrolein in the Sample, µg	< 15.3	< 16.8	< 18.3	< 16.8
$C_3H_4O_{mg}$	Total Mass of Acrolein in the Sample, mg	< 0.015	< 0.017	< 0.018	< 0.017
$C_3H_4O_{mg/dscm}$	Acrolein Concentration in Air, mg/dscm	< 0.63	< 0.70	< 0.76	< 0.70
$C_3H_4O_{ppmvd}$	Acrolein Concentration, ppmvd	< 0.27	< 0.30	< 0.33	< 0.30
$C_3H_4O_{lb/hr}$	Acrolein Emission Rate, lb/hr	< 0.037	< 0.040	< 0.044	< 0.040
$C_6H_6O_{\mu g/mL}$	Phenol Concentration in the Sample, µg/mL	< 0.25	< 0.25	< 0.25	< 0.25
Vol.	Volume of Sample Collected, mL	61	67	73	67
$C_6H_6O_{\mu g}$	Total Mass of Phenol in the Sample, µg	< 15.3	< 16.8	< 18.3	< 16.8
$C_6H_6O_{mg}$	Total Mass of Phenol in the Sample, mg	< 0.015	< 0.017	< 0.018	< 0.017
$C_6H_6O_{mg/dscm}$	Phenol Concentration in Air, mg/dscm	< 0.63	< 0.70	< 0.76	< 0.70
$C_6H_6O_{ppmvd}$	Phenol Concentration, ppmvd	< 0.16	< 0.18	< 0.19	< 0.18
$C_6H_6O_{lb/hr}$	Phenol Emission Rate, lb/hr	< 0.037	< 0.040	< 0.044	< 0.040
$CH_2O_{\mu g/mL}$	Formaldehyde Concentration in the Sample, µg/mL	< 0.05	< 0.05	< 0.05	< 0.05
Vol.	Volume of Sample Collected, mL	61	67	73	67
$CH_2O_{\mu g}$	Total Mass of Formaldehyde in the Sample, µg	< 3.05	< 3.35	< 3.65	< 3.35
CH_2O_{mg}	Total Mass of Formaldehyde in the Sample, mg	< 0.003	< 0.003	< 0.004	< 0.003
$CH_2O_{mg/dscm}$	Formaldehyde Concentration in Air, mg/dscm	< 0.13	< 0.14	< 0.15	< 0.14
CH_2O_{ppmvd}	Formaldehyde Concentration, ppmvd	< 0.10	< 0.11	< 0.12	< 0.11
$CH_2O_{lb/hr}$	Formaldehyde Emission Rate, lb/hr	< 0.0073	< 0.0079	< 0.0087	< 0.0080
$CH_2O_{lb/MSF}$	Formaldehyde Emission Rate, lb/MSF	< 0.0014	< 0.0025	< 0.0026	< 0.0022
$HAPS_{lb/hr}$	Total HAPS Emission Rate, lb/hr	< 0.037	< 0.040	< 0.044	< 0.040
$HAPS_{lb/MSF}$	Total HAPS Emission Rate, lb/MSF	< 0.007	< 0.012	< 0.013	< 0.011

**Run paused due to unit upset. See the Problems, Deviations, and/or Exceptions section.*
For results below the reporting limit, half the reporting limit was used in the calculations.

Table 6. Press Vent #1 East Vent NCASI Method 99.02 Test Results – October 26, 2016 – Part 2

GOLDEN SPECIALTY

Air Quality Test Report

Plant	Neucor, Inc.	Address	White Swan, WA	Job #	160282
Location	Press Vent #1 (West Vent)	Personnel	SN/AK/JA/JH	Date	10/26/2016

	Run Number	1	*2	3	Average
Date	Test Date	10/26/2016	10/26/2016	10/26/2016	
Start	Run Start Time	12:25	14:30	16:28	
	Run Finish Time	13:25	15:47	17:28	
Θ	Net Run Time, min.	60	60	60	60.0
C_p	Pitot Tube Coeficient	0.84	0.84	0.84	0.84
Y	Dry Gas Meter Calibration Factor	0.977	0.977	0.977	0.977
P_{Br}	Barometric Pressure, in. Hg	29.38	29.38	29.38	29.38
ΔH	Average orifice meter Differential, inches H_2O	1.50	1.50	1.50	1.50
V_m	Dry Gas Meter Volume Sampled, ft^3	42.359	42.271	42.570	42.400
t_m	Average Dry Gas Meter Temperature, °F	53.6	62.8	66.8	61.0
V_{mstd}	Dry Gas Meter Volume Sampled, dscf	41.935	41.114	41.091	41.380
V_{mstd}	Dry Gas Meter Volume Sampled, dscm	1.188	1.164	1.164	1.172
V_{lc}	Total Moisture Liquid collected, g	14.6	13.6	14.6	14.3
V_{wstd}	Volume of Water Vapor, scf	0.69	0.64	0.69	0.67
% H_2O	Moisture Content of Stack Gas, %	1.62	1.54	1.65	1.60
%CO_2	Carbon Dioxide, % vd	0.03	0.04	0.05	0.04
%O_2	Oxygen, % vd	20.95	20.94	20.94	20.94
M_d	Dry Molecular Weight, lb/lb-Mole	28.84	28.84	28.84	28.84
M_s	Wet Molecular weight, lb/lb-Mole	28.67	28.68	28.67	28.67
P_g	Flue Gas Static Pressure, in. H_2O	0.10	0.10	0.10	0.10
P_s	Absolute Flue Gas Pressure, in. Hg	29.39	29.39	29.39	29.39
t_s	Average Stack Gas Temperature, °F	83.4	83.8	86.7	84.7
$\sqrt{\Delta P_{avg}}$	Average Square-Root Velocity Head, in H_2O	0.480	0.476	0.478	0.478
v_s	Average Stack Gas Velocity, ft/sec	27.66	27.46	27.64	27.59
A_s	Stack Crossectional Area, ft^2	11.54	11.54	11.54	11.54
Q_{sd}	Dry Volumetric Flow Rate, dry scfm	17,981	17,856	17,856	17,898
Q_{aw}	Actual Wet Volumetric Flue Gas Flow Rate, acfm	19,151	19,017	19,139	19,102
$MSF_{3/4}$	Thousand square feet of board quantity (based on 3/4" basis) per hour	5.14	3.22	3.33	3.90
NCASI 99.02 Sampling Data					
t_m	Average Dry Gas Meter Temperature, °F	54.50	60.67	60.83	58.67
V_m	Gas Meter Volume Sampled, L	23.387	23.061	23.078	23.175
V_{mstd}	Dry Standard Gas Meter Volume Sampled, dscm	0.023	0.023	0.023	0.023
$C_2H_4O_{\mu g/mL}$	Acetaldehyde Concentration in the Sample, µg/mL	< 0.25	< 0.25	< 0.25	< 0.25
Vol.	Volume of Sample Collected, mL	71	74	74	73
$C_2H_4O_{\mu g}$	Total Mass of Acetaldehyde in the Sample, µg	< 17.8	< 18.5	< 18.5	< 18.3
$C_2H_4O_{mg}$	Total Mass of Acetaldehyde in the Sample, mg	< 0.018	< 0.019	< 0.019	< 0.018
$C_2H_4O_{mg/dscm}$	Acetaldehyde Concentration in Air, mg/dscm	< 0.76	< 0.80	< 0.80	< 0.79
$C_2H_4O_{ppmvd}$	Acetaldehyde Concentration, ppmvd	< 0.41	< 0.44	< 0.44	< 0.43
$C_2H_4O_{lb/hr}$	Acetaldehyde Emission Rate, lb/hr	< 0.051	< 0.054	< 0.054	< 0.053
$C_3H_6O_{\mu g/mL}$	Propionaldehyde Concentration in the Sample, µg/mL	< 0.25	< 0.25	< 0.25	< 0.25
Vol.	Volume of Sample Collected, mL	71	74	74	73
$C_3H_6O_{\mu g}$	Total Mass of Propionaldehyde in the Sample, µg	< 17.8	< 18.5	< 18.5	< 18.3
$C_3H_6O_{mg}$	Total Mass of Propionaldehyde in the Sample, mg	< 0.018	< 0.019	< 0.019	< 0.018
$C_3H_6O_{mg/dscm}$	Propionaldehyde Concentration in Air, mg/dscm	< 0.76	< 0.80	< 0.80	< 0.79
$C_3H_6O_{ppmvd}$	Propionaldehyde Concentration, ppmvd	< 0.31	< 0.33	< 0.33	< 0.33
$C_3H_6O_{lb/hr}$	Propionaldehyde Emission Rate, lb/hr	< 0.051	< 0.054	< 0.054	< 0.053
$CH_4O_{\mu g/mL}$	Methanol Concentration in the Sample, µg/mL	< 0.25	< 0.25	< 0.25	< 0.25
Vol.	Volume of Sample Collected, mL	71	74	74	73
$CH_4O_{\mu g}$	Total Mass of Methanol in the Sample, µg	< 17.8	< 18.5	< 18.5	< 18.3
CH_4O_{mg}	Total Mass of Methanol in the Sample, mg	< 0.018	< 0.019	< 0.019	< 0.018
$CH_4O_{mg/dscm}$	Methanol Concentration in Air, mg/dscm	< 0.76	< 0.80	< 0.80	< 0.79
CH_4O_{ppmvd}	Methanol Concentration, ppmvd	< 0.57	< 0.60	< 0.60	< 0.59
$CH_4O_{lb/hr}$	Methanol Emission Rate, lb/hr	< 0.051	< 0.054	< 0.054	< 0.053

Run paused due to unit upset. See the Problems, Deviations, and/or Exceptions section.

Table 7. Press Vent #1 West Vent NCASI Method 99.02 Test Results – October 26, 2016 – Part 1

GOLDEN SPECIALTY

Air Quality Test Report

Plant	Neucor, Inc.	Address	White Swan, WA	Job #	160282
Location	Press Vent #1 (West Vent)	Personnel	SN/AK/JA/JH	Date	10/26/2016

	Run Number	1	*2	3	Average
Date	Test Date	10/26/2016	10/26/2016	10/26/2016	
Start	Run Start Time	12:25	14:30	16:28	
	Run Finish Time	13:25	15:47	17:28	
θ	Net Run Time, min.	60	60	60	60.0
C_p	Pitot Tube Coeficient	0.84	0.84	0.84	0.84
Y	Dry Gas Meter Calibration Factor	0.977	0.977	0.977	0.977
P_{Br}	Barometric Pressure, in. Hg	29.38	29.38	29.38	29.38
ΔH	Average orifice meter Differential, inches H_2O	1.50	1.50	1.50	1.50
V_m	Dry Gas Meter Volume Sampled, ft^3	42.359	42.271	42.570	42.400
t_m	Average Dry Gas Meter Temperature, °F	53.6	62.8	66.8	61.0
V_{mstd}	Dry Gas Meter Volume Sampled, dscf	41.935	41.114	41.091	41.380
V_{mstd}	Dry Gas Meter Volume Sampled, dscm	1.188	1.164	1.164	1.172
V_{lc}	Total Moisture Liquid collected, g	14.6	13.6	14.6	14.3
V_{wstd}	Volume of Water Vapor, scf	0.69	0.64	0.69	0.67
% H_2O	Moisture Content of Stack Gas, %	1.62	1.54	1.65	1.60
%CO_2	Carbon Dioxide, % vd	0.03	0.04	0.05	0.04
%O_2	Oxygen, % vd	20.95	20.94	20.94	20.94
M_d	Dry Molecular Weight, lb/lb-Mole	28.84	28.84	28.84	28.84
M_s	Wet Molecular weight, lb/lb-Mole	28.67	28.68	28.67	28.67
P_g	Flue Gas Static Pressure, in. H_2O	0.10	0.10	0.10	0.10
P_s	Absolute Flue Gas Pressure, in. Hg	29.39	29.39	29.39	29.39
t_s	Average Stack Gas Temperature, °F	83.4	83.8	86.7	84.7
$\sqrt{\Delta P}_{avg}$	Average Square-Root Velocity Head, in H_2O	0.480	0.476	0.478	0.478
v_s	Average Stack Gas Velocity, ft/sec	27.66	27.46	27.64	27.59
A_s	Stack Crossectional Area, ft^2	11.54	11.54	11.54	11.54
Q_{sd}	Dry Volumetric Flow Rate, dry scfm	17,981	17,856	17,856	17,898
Q_{aw}	Actual Wet Volumetric Flue Gas Flow Rate, acfm	19,151	19,017	19,139	19,102
$MSF_{3/4}$	Thousand square feet of board quantity (based on 3/4" basis) per hour	5.14	3.22	3.33	3.90
NCASI 99.02 Sampling Data					
t_m	Average Dry Gas Meter Temperature, °F	54.50	60.67	60.83	58.67
V_m	Gas Meter Volume Sampled, L	23.387	23.061	23.078	23.175
V_{mstd}	Dry Standard Gas Meter Volume Sampled, dscm	0.023	0.023	0.023	0.023
$C_3H_4O_{\mu g/mL}$	Acrolein Concentration in the Sample, µg/mL	< 0.25	< 0.25	< 0.25	< 0.25
Vol.	Volume of Sample Collected, mL	71	74	74	73
$C_3H_4O_{\mu g}$	Total Mass of Acrolein in the Sample, µg	< 17.8	< 18.5	< 18.5	< 18.3
$C_3H_4O_{mg}$	Total Mass of Acrolein in the Sample, mg	< 0.018	< 0.019	< 0.019	< 0.018
$C_3H_4O_{mg/dscm}$	Acrolein Concentration in Air, mg/dscm	< 0.76	< 0.80	< 0.80	< 0.79
$C_3H_4O_{ppmvd}$	Acrolein Concentration, ppmvd	< 0.33	< 0.34	< 0.34	< 0.34
$C_3H_4O_{lb/hr}$	Acrolein Emission Rate, lb/hr	< 0.051	< 0.054	< 0.054	< 0.053
$C_6H_6O_{\mu g/mL}$	Phenol Concentration in the Sample, µg/mL	< 0.25	< 0.25	< 0.25	< 0.25
Vol.	Volume of Sample Collected, mL	71	74	74	73
$C_6H_6O_{\mu g}$	Total Mass of Phenol in the Sample, µg	< 17.8	< 18.5	< 18.5	< 18.3
$C_6H_6O_{mg}$	Total Mass of Phenol in the Sample, mg	< 0.018	< 0.019	< 0.019	< 0.018
$C_6H_6O_{mg/dscm}$	Phenol Concentration in Air, mg/dscm	< 0.76	< 0.80	< 0.80	< 0.79
$C_6H_6O_{ppmvd}$	Phenol Concentration, ppmvd	< 0.19	< 0.20	< 0.20	< 0.20
$C_6H_6O_{lb/hr}$	Phenol Emission Rate, lb/hr	< 0.051	< 0.054	< 0.054	< 0.053
$CH_2O_{\mu g/mL}$	Formaldehyde Concentration in the Sample, µg/mL	0.12	< 0.05	< 0.05	< 0.07
Vol.	Volume of Sample Collected, mL	71	74	74	73
$CH_2O_{\mu g}$	Total Mass of Formaldehyde in the Sample, µg	8.52	< 3.70	< 3.70	< 5.31
CH_2O_{mg}	Total Mass of Formaldehyde in the Sample, mg	0.009	< 0.004	< 0.004	< 0.005
$CH_2O_{mg/dscm}$	Formaldehyde Concentration in Air, mg/dscm	0.36	< 0.16	< 0.16	< 0.23
CH_2O_{ppmvd}	Formaldehyde Concentration, ppmvd	0.29	< 0.13	< 0.13	< 0.18
$CH_2O_{lb/hr}$	Formaldehyde Emission Rate, lb/hr	0.025	< 0.011	< 0.011	< 0.015
$CH_2O_{lb/MSF}$	Formaldehyde Emission Rate, lb/MSF	0.005	< 0.003	< 0.003	< 0.004
$HAPS_{lb/hr}$	Total HAPS Emission Rate, lb/hr	< 0.076	< 0.054	< 0.054	< 0.061
$HAPS_{lb/MSF}$	Total HAPS Emission Rate, lb/MSF	< 0.015	< 0.017	< 0.016	< 0.016

**Run paused due to unit upset. See the Problems, Deviations, and/or Exceptions section.*
For results below the reporting limit, half the reporting limit was used in the calculations.

Table 8. Press Vent #1 West Vent NCASI Method 99.02 Test Results – October 26, 2016 – Part 2

GOLDEN SPECIALTY

Air Quality Test Report

Plant	Neucor, Inc.	Address	White Swan, WA	Job #	160282
Location	Line Former #1	Personnel	SN/AK/JA/JH	Date	10/27/2016

	Run Number	*1	2	3	Average
Date	Test Date	10/27/2016	10/27/2016	10/27/2016	
Start	Run Start Time	8:29	10:26	11:47	
	Run Finish Time	10:03	11:26	12:47	
Θ	Net Run Time, min.	60	60	60	60.0
C_p	Pitot Tube Coefficient	0.84	0.84	0.84	0.84
Y	Dry Gas Meter Calibration Factor	1.010	1.010	1.010	1.010
P_{Br}	Barometric Pressure, in. Hg	28.90	28.90	28.90	28.90
ΔH	Average orifice meter Differential, inches H_2O	1.50	1.50	1.50	1.50
V_m	Dry Gas Meter Volume Sampled, ft^3	41.975	42.304	41.931	42.070
t_m	Average Dry Gas Meter Temperature, °F	54.4	56.0	56.2	55.5
V_{mstd}	Dry Gas Meter Volume Sampled, dscf	42.191	42.391	42.004	42.196
V_{mstd}	Dry Gas Meter Volume Sampled, dscm	1.195	1.201	1.190	1.195
V_{lc}	Total Moisture Liquid collected, g	14.5	16.4	11.4	14.1
V_{wstd}	Volume of Water Vapor, scf	0.68	0.77	0.54	0.66
% H_2O	Moisture Content of Stack Gas, %	1.59	1.79	1.26	1.55
%CO_2	Carbon Dioxide, % vd	0.03	0.03	0.02	0.03
%O_2	Oxygen, % vd	20.96	20.98	20.99	20.98
M_d	Dry Molecular Weight, lb/lb-Mole	28.84	28.84	28.84	28.84
M_s	Wet Molecular weight, lb/lb-Mole	28.67	28.65	28.71	28.68
P_g	Flue Gas Static Pressure, in. H_2O	0.15	0.15	0.15	0.15
P_s	Absolute Flue Gas Pressure, in. Hg	28.91	28.91	28.91	28.91
t_s	Average Stack Gas Temperature, °F	72.6	76.0	73.0	73.9
$\sqrt{\Delta P}_{avg}$	Average Square-Root Velocity Head, in H_2O	0.239	0.361	0.490	0.363
v_s	Average Stack Gas Velocity, ft/sec	13.75	20.83	28.19	20.92
A_s	Stack Crossectional Area, ft^2	9.33	9.33	9.33	9.33
Q_{sd}	Dry Volumetric Flow Rate, dry scfm	7,258	10,903	14,922	11,028
Q_{aw}	Actual Wet Volumetric Flue Gas Flow Rate, acfm	7,700	11,664	15,788	11,717
ODT	Oven dried tons per hour	3.28	3.17	3.31	3.25
NCASI 99.02 Sampling Data					
t_m	Average Dry Gas Meter Temperature, °F	54.50	59.67	63.50	59.22
V_m	Gas Meter Volume Sampled, L	24.041	23.791	23.723	23.852
V_{mstd}	Dry Standard Gas Meter Volume Sampled, dscm	0.024	0.024	0.024	0.024
$C_2H_4O_{\mu g/mL}$	Acetaldehyde Concentration in the Sample, µg/mL	< 0.25	< 0.25	< 0.25	< 0.25
Vol.	Volume of Sample Collected, mL	75	76	74	75
$C_2H_4O_{\mu g}$	Total Mass of Acetaldehyde in the Sample, µg	< 18.8	< 19.0	< 18.5	< 18.8
$C_2H_4O_{mg}$	Total Mass of Acetaldehyde in the Sample, mg	< 0.019	< 0.019	< 0.019	< 0.019
$C_2H_4O_{mg/dscm}$	Acetaldehyde Concentration in Air, mg/dscm	< 0.78	< 0.80	< 0.78	< 0.79
$C_2H_4O_{ppmvd}$	Acetaldehyde Concentration, ppmvd	< 0.43	< 0.44	< 0.43	< 0.43
$C_2H_4O_{lb/hr}$	Acetaldehyde Emission Rate, lb/hr	< 0.021	< 0.033	< 0.044	< 0.032
$C_3H_6O_{\mu g/mL}$	Propionaldehyde Concentration in the Sample, µg/mL	< 0.25	< 0.25	< 0.25	< 0.25
Vol.	Volume of Sample Collected, mL	75	76	74	75
$C_3H_6O_{\mu g}$	Total Mass of Propionaldehyde in the Sample, µg	< 18.8	< 19.0	< 18.5	< 18.8
$C_3H_6O_{mg}$	Total Mass of Propionaldehyde in the Sample, mg	< 0.019	< 0.019	< 0.019	< 0.019
$C_3H_6O_{mg/dscm}$	Propionaldehyde Concentration in Air, mg/dscm	< 0.78	< 0.80	< 0.78	< 0.79
$C_3H_6O_{ppmvd}$	Propionaldehyde Concentration, ppmvd	< 0.32	< 0.33	< 0.32	< 0.33
$C_3H_6O_{lb/hr}$	Propionaldehyde Emission Rate, lb/hr	< 0.021	< 0.033	< 0.044	< 0.032
$CH_4O_{\mu g/mL}$	Methanol Concentration in the Sample, µg/mL	< 0.25	< 0.25	< 0.25	< 0.25
Vol.	Volume of Sample Collected, mL	75	76	74	75
$CH_4O_{\mu g}$	Total Mass of Methanol in the Sample, µg	< 18.8	< 19.0	< 18.5	< 18.8
CH_4O_{mg}	Total Mass of Methanol in the Sample, mg	< 0.019	< 0.019	< 0.019	< 0.019
$CH_4O_{mg/dscm}$	Methanol Concentration in Air, mg/dscm	< 0.78	< 0.80	< 0.78	< 0.79
CH_4O_{ppmvd}	Methanol Concentration, ppmvd	< 0.59	< 0.60	< 0.58	< 0.59
$CH_4O_{lb/hr}$	Methanol Emission Rate, lb/hr	< 0.021	< 0.033	< 0.044	< 0.032
$CH_4O_{lb/ODT}$	Methanol Emission Rate, lb/ODT	< 0.006	< 0.010	< 0.013	< 0.010

**Run paused due to unit upset. See the Problems, Deviations, and/or Exceptions section.*
For results below the reporting limit, half the reporting limit was used in the calculations.

Table 9. Line Former #1 NCASI Method 99.02 Test Results – October 27, 2016 – Part 1

GOLDEN SPECIALTY

Air Quality Test Report

Plant	Neucor, Inc.	Address	White Swan, WA	Job #	160282
Location	Line Former #1	Personnel	SN/AK/JA/JH	Date	10/27/2016

	Run Number	*1	2	3	Average
Date	Test Date	10/27/2016	10/27/2016	10/27/2016	
Start	Run Start Time	8:29	10:26	11:47	
	Run Finish Time	10:03	11:26	12:47	
Θ	Net Run Time, min.	60	60	60	60.0
C_p	Pitot Tube Coefficient	0.84	0.84	0.84	0.84
Y	Dry Gas Meter Calibration Factor	1.010	1.010	1.010	1.010
P_{Br}	Barometric Pressure, in. Hg	28.90	28.90	28.90	28.90
ΔH	Average orifice meter Differential, inches H_2O	1.50	1.50	1.50	1.50
V_m	Dry Gas Meter Volume Sampled, ft^3	41.975	42.304	41.931	42.070
t_m	Average Dry Gas Meter Temperature, °F	54.4	56.0	56.2	55.5
V_{mstd}	Dry Gas Meter Volume Sampled, dscf	42.191	42.391	42.004	42.196
V_{mstd}	Dry Gas Meter Volume Sampled, dscm	1.195	1.201	1.190	1.195
V_{lc}	Total Moisture Liquid collected, g	14.5	16.4	11.4	14.1
V_{wstd}	Volume of Water Vapor, scf	0.68	0.77	0.54	0.66
% H_2O	Moisture Content of Stack Gas, %	1.59	1.79	1.26	1.55
%CO_2	Carbon Dioxide, % vd	0.03	0.03	0.02	0.03
%O_2	Oxygen, % vd	20.96	20.98	20.99	20.98
M_d	Dry Molecular Weight, lb/lb-Mole	28.84	28.84	28.84	28.84
M_s	Wet Molecular weight, lb/lb-Mole	28.67	28.65	28.71	28.68
P_g	Flue Gas Static Pressure, in. H_2O	0.15	0.15	0.15	0.15
P_s	Absolute Flue Gas Pressure, in. Hg	28.91	28.91	28.91	28.91
t_s	Average Stack Gas Temperature, °F	72.6	76.0	73.0	73.9
$\sqrt{\Delta P_{avg}}$	Average Square-Root Velocity Head, in H_2O	0.239	0.361	0.490	0.363
v_s	Average Stack Gas Velocity, ft/sec	13.75	20.83	28.19	20.92
A_s	Stack Crossectional Area, ft^2	9.33	9.33	9.33	9.33
Q_{sd}	Dry Volumetric Flow Rate, dry scfm	7,258	10,903	14,922	11,028
Q_{aw}	Actual Wet Volumetric Flue Gas Flow Rate, acfm	7,700	11,664	15,788	11,717
ODT	Oven dried tons per hour	3.28	3.17	3.31	3.25
NCASI 99.02 Sampling Data					
t_m	Average Dry Gas Meter Temperature, °F	54.50	59.67	63.50	59.22
V_m	Gas Meter Volume Sampled, L	24.041	23.791	23.723	23.852
V_{mstd}	Dry Standard Gas Meter Volume Sampled, dscm	0.024	0.024	0.024	0.024
$C_3H_4O_{\mu g/mL}$	Acrolein Concentration in the Sample, µg/mL	< 0.25	< 0.25	< 0.25	< 0.25
Vol.	Volume of Sample Collected, mL	75	76	74	75
$C_3H_4O_{\mu g}$	Total Mass of Acrolein in the Sample, µg	< 18.8	< 19.0	< 18.5	< 18.8
$C_3H_4O_{mg}$	Total Mass of Acrolein in the Sample, mg	< 0.019	< 0.019	< 0.019	< 0.019
$C_3H_4O_{mg/dscm}$	Acrolein Concentration in Air, mg/dscm	< 0.78	< 0.80	< 0.78	< 0.79
$C_3H_4O_{ppmvd}$	Acrolein Concentration, ppmvd	< 0.33	< 0.34	< 0.33	< 0.34
$C_3H_4O_{lb/hr}$	Acrolein Emission Rate, lb/hr	< 0.021	< 0.033	< 0.044	< 0.032
$C_6H_6O_{\mu g/mL}$	Phenol Concentration in the Sample, µg/mL	< 0.25	< 0.25	< 0.25	< 0.25
Vol.	Volume of Sample Collected, mL	75	76	74	75
$C_6H_6O_{\mu g}$	Total Mass of Phenol in the Sample, µg	< 18.8	< 19.0	< 18.5	< 18.8
$C_6H_6O_{mg}$	Total Mass of Phenol in the Sample, mg	< 0.019	< 0.019	< 0.019	< 0.019
$C_6H_6O_{mg/dscm}$	Phenol Concentration in Air, mg/dscm	< 0.78	< 0.80	< 0.78	< 0.79
$C_6H_6O_{ppmvd}$	Phenol Concentration, ppmvd	< 0.20	< 0.20	< 0.20	< 0.20
$C_6H_6O_{lb/hr}$	Phenol Emission Rate, lb/hr	< 0.021	< 0.033	< 0.044	< 0.032
$CH_2O_{\mu g/mL}$	Formaldehyde Concentration in the Sample, µg/mL	< 0.05	< 0.05	< 0.05	< 0.05
Vol.	Volume of Sample Collected, mL	75	76	74	75
$CH_2O_{\mu g}$	Total Mass of Formaldehyde in the Sample, µg	< 3.75	< 3.80	< 3.70	< 3.75
CH_2O_{mg}	Total Mass of Formaldehyde in the Sample, mg	< 0.004	< 0.004	< 0.004	< 0.004
$CH_2O_{mg/dscm}$	Formaldehyde Concentration in Air, mg/dscm	< 0.16	< 0.16	< 0.16	< 0.16
CH_2O_{ppmvd}	Formaldehyde Concentration, ppmvd	< 0.12	< 0.13	< 0.12	< 0.13
$CH_2O_{lb/hr}$	Formaldehyde Emission Rate, lb/hr	< 0.0042	< 0.0065	< 0.0087	< 0.0065
$CH_2O_{lb/ODT}$	Formaldehyde Emission Rate, lb/ODT	< 0.0013	< 0.0021	< 0.0026	< 0.0020
$HAPS_{lb/hr}$	Total HAPS Emission Rate, lb/hr	< 0.021	< 0.033	< 0.044	< 0.032
$HAPS_{lb/ODT}$	Total HAPS Emission Rate, lb/ODT	< 0.006	< 0.010	< 0.013	< 0.010

**Run paused due to unit upset. See the Problems, Deviations, and/or Exceptions section.*
For results below the reporting limit, half the reporting limit was used in the calculations.

Table 10. Line Former #1 NCASI Method 99.02 Test Results – October 27, 2016, 2016 – Part 2

GOLDEN SPECIALTY

Air Quality Test Report

Plant	Neucor, Inc.	Address	White Swan, WA	Job #	160282
Location	Dryer Vent # 1	Personnel	SN/AK/JA/JH	Date	10/27/2016

	Run Number	1	2	3	Average
Date	Test Date	10/27/2016	10/27/2016	10/27/2016	
Start	Run Start Time	14:31	16:20	17:49	
	Run Finish Time	15:31	17:20	18:49	
Θ	Net Run Time, min.	60	60	60	60.0
C_p	Pitot Tube Coefficient	0.84	0.84	0.84	0.84
Y	Dry Gas Meter Calibration Factor	1.010	1.010	1.010	1.010
P_{Br}	Barometric Pressure, in. Hg	28.90	28.90	28.90	28.90
ΔH	Average orifice meter Differential, inches H_2O	1.50	1.50	1.50	1.50
V_m	Dry Gas Meter Volume Sampled, ft^3	40.423	41.138	39.847	40.469
t_m	Average Dry Gas Meter Temperature, °F	57.8	63.6	56.3	59.3
V_{mstd}	Dry Gas Meter Volume Sampled, dscf	40.363	40.626	39.904	40.298
V_{mstd}	Dry Gas Meter Volume Sampled, dscm	1.143	1.151	1.130	1.141
V_{lc}	Total Moisture Liquid collected, g	82.7	90.4	88.4	87.2
V_{wstd}	Volume of Water Vapor, scf	3.90	4.26	4.17	4.11
% H_2O	Moisture Content of Stack Gas, %	8.81	9.50	9.46	9.25
%CO_2	Carbon Dioxide, % vd	0.03	0.01	0.03	0.02
%O_2	Oxygen, % vd	20.96	20.99	20.98	20.98
M_d	Dry Molecular Weight, lb/lb-Mole	28.84	28.84	28.84	28.84
M_s	Wet Molecular weight, lb/lb-Mole	27.89	27.81	27.82	27.84
P_g	Flue Gas Static Pressure, in. H_2O	0.81	0.81	0.81	0.81
P_s	Absolute Flue Gas Pressure, in. Hg	28.96	28.96	28.96	28.96
t_s	Average Stack Gas Temperature, °F	139.0	140.0	139.0	139.3
$\sqrt{\Delta P_{avg}}$	Average Square-Root Velocity Head, in H_2O	1.304	1.304	1.304	1.304
v_s	Average Stack Gas Velocity, ft/sec	80.64	80.81	80.74	80.73
A_s	Stack Crossectional Area, ft^2	11.54	11.54	11.54	11.54
Q_{sd}	Dry Volumetric Flow Rate, dry scfm	43,443	43,139	43,187	43,256
Q_{aw}	Actual Wet Volumetric Flue Gas Flow Rate, acfm	55,838	55,961	55,907	55,902
ODT	Oven dried tons per hour	2.85	2.79	2.88	2.84
NCASI 99.02 Sampling Data					
t_m	Average Dry Gas Meter Temperature, °F	58.67	66.83	56.67	60.72
V_m	Gas Meter Volume Sampled, L	23.822	23.485	21.703	23.003
V_{mstd}	Dry Standard Gas Meter Volume Sampled, dscm	0.024	0.023	0.022	0.023
$C_2H_4O_{\mu g/mL}$	Acetaldehyde Concentration in the Sample, µg/mL	< 0.25	< 0.25	< 0.25	< 0.25
Vol.	Volume of Sample Collected, mL	76	77	76	76
$C_2H_4O_{\mu g}$	Total Mass of Acetaldehyde in the Sample, µg	< 19.0	< 19.3	< 19.0	< 19.1
$C_2H_4O_{mg}$	Total Mass of Acetaldehyde in the Sample, mg	< 0.019	< 0.019	< 0.019	< 0.019
$C_2H_4O_{mg/dscm}$	Acetaldehyde Concentration in Air, mg/dscm	< 0.80	< 0.82	< 0.88	< 0.83
$C_2H_4O_{ppmvd}$	Acetaldehyde Concentration, ppmvd	< 0.44	< 0.45	< 0.48	< 0.45
$C_2H_4O_{lb/hr}$	Acetaldehyde Emission Rate, lb/hr	< 0.130	< 0.132	< 0.142	< 0.135
$C_3H_6O_{\mu g/mL}$	Propionaldehyde Concentration in the Sample, µg/mL	< 0.25	< 0.25	< 0.25	< 0.25
Vol.	Volume of Sample Collected, mL	76	77	76	76
$C_3H_6O_{\mu g}$	Total Mass of Propionaldehyde in the Sample, µg	< 19.0	< 19.3	< 19.0	< 19.1
$C_3H_6O_{mg}$	Total Mass of Propionaldehyde in the Sample, mg	< 0.019	< 0.019	< 0.019	< 0.019
$C_3H_6O_{mg/dscm}$	Propionaldehyde Concentration in Air, mg/dscm	< 0.80	< 0.82	< 0.88	< 0.83
$C_3H_6O_{ppmvd}$	Propionaldehyde Concentration, ppmvd	< 0.33	< 0.34	< 0.36	< 0.34
$C_3H_6O_{lb/hr}$	Propionaldehyde Emission Rate, lb/hr	< 0.130	< 0.132	< 0.142	< 0.135
$CH_4O_{\mu g/mL}$	Methanol Concentration in the Sample, µg/mL	< 0.25	< 0.25	< 0.25	< 0.25
Vol.	Volume of Sample Collected, mL	76	77	76	76
$CH_4O_{\mu g}$	Total Mass of Methanol in the Sample, µg	< 19.0	< 19.3	< 19.0	< 19.1
CH_4O_{mg}	Total Mass of Methanol in the Sample, mg	< 0.019	< 0.019	< 0.019	< 0.019
$CH_4O_{mg/dscm}$	Methanol Concentration in Air, mg/dscm	< 0.80	< 0.82	< 0.88	< 0.83
CH_4O_{ppmvd}	Methanol Concentration, ppmvd	< 0.60	< 0.61	< 0.66	< 0.62
$CH_4O_{lb/hr}$	Methanol Emission Rate, lb/hr	< 0.130	< 0.132	< 0.142	< 0.135
$CH_4O_{lb/ODT}$	Methanol Emission Rate, lb/ODT	< 0.045	< 0.047	< 0.049	< 0.047

For results below the reporting limit, half the reporting limit was used in the calculations.

Table 11. Dryer Vent #1 NCASI Method 99.02 Test Results – October 27, 2016 – Part 1

GOLDEN SPECIALTY

Air Quality Test Report

Plant	Neucor, Inc.	Address	White Swan, WA	Job #	160282
Location	Dryer Vent # 1	Personnel	SN/AK/JA/JH	Date	10/27/2016

	Run Number	1	2	3	Average
Date	Test Date	10/27/2016	10/27/2016	10/27/2016	
Start	Run Start Time	14:31	16:20	17:49	
	Run Finish Time	15:31	17:20	18:49	
Θ	Net Run Time, min.	60	60	60	60.0
C_p	Pitot Tube Coefficient	0.84	0.84	0.84	0.84
Y	Dry Gas Meter Calibration Factor	1.010	1.010	1.010	1.010
P_{Br}	Barometric Pressure, in. Hg	28.90	28.90	28.90	28.90
ΔH	Average orifice meter Differential, inches H_2O	1.50	1.50	1.50	1.50
V_m	Dry Gas Meter Volume Sampled, ft^3	40.423	41.138	39.847	40.469
t_m	Average Dry Gas Meter Temperature, °F	57.8	63.6	56.3	59.3
V_{mstd}	Dry Gas Meter Volume Sampled, dscf	40.363	40.626	39.904	40.298
V_{mstd}	Dry Gas Meter Volume Sampled, dscm	1.143	1.151	1.130	1.141
V_{lc}	Total Moisture Liquid collected, g	82.7	90.4	88.4	87.2
V_{wstd}	Volume of Water Vapor, scf	3.90	4.26	4.17	4.11
% H_2O	Moisture Content of Stack Gas, %	8.81	9.50	9.46	9.25
$\%CO_2$	Carbon Dioxide, % vd	0.03	0.01	0.03	0.02
$\%O_2$	Oxygen, % vd	20.96	20.99	20.98	20.98
M_d	Dry Molecular Weight, lb/lb-Mole	28.84	28.84	28.84	28.84
M_s	Wet Molecular weight, lb/lb-Mole	27.89	27.81	27.82	27.84
P_g	Flue Gas Static Pressure, in. H_2O	0.81	0.81	0.81	0.81
P_s	Absolute Flue Gas Pressure, in. Hg	28.96	28.96	28.96	28.96
t_s	Average Stack Gas Temperature, °F	139.0	140.0	139.0	139.3
$\sqrt{\Delta P_{avg}}$	Average Square-Root Velocity Head, in H_2O	1.304	1.304	1.304	1.304
v_s	Average Stack Gas Velocity, ft/sec	80.64	80.81	80.74	80.73
A_s	Stack Crossectional Area, ft^2	11.54	11.54	11.54	11.54
Q_{sd}	Dry Volumetric Flow Rate, dry scfm	43,443	43,139	43,187	43,256
Q_{aw}	Actual Wet Volumetric Flue Gas Flow Rate, acfm	55,838	55,961	55,907	55,902
ODT	Oven dried tons per hour	2.85	2.79	2.88	2.84
NCASI 99.02 Sampling Data					
t_m	Average Dry Gas Meter Temperature, °F	58.67	66.83	56.67	60.72
V_m	Gas Meter Volume Sampled, L	23.822	23.485	21.703	23.003
V_{mstd}	Dry Standard Gas Meter Volume Sampled, dscm	0.024	0.023	0.022	0.023
$C_3H_4O_{\mu g/mL}$	Acrolein Concentration in the Sample, µg/mL	< 0.25	< 0.25	< 0.25	< 0.25
Vol.	Volume of Sample Collected, mL	76	77	76	76
$C_3H_4O_{\mu g}$	Total Mass of Acrolein in the Sample, µg	< 19.0	< 19.3	< 19.0	< 19.1
$C_3H_4O_{mg}$	Total Mass of Acrolein in the Sample, mg	< 0.019	< 0.019	< 0.019	< 0.019
$C_3H_4O_{mg/dscm}$	Acrolein Concentration in Air, mg/dscm	< 0.80	< 0.82	< 0.88	< 0.83
$C_3H_4O_{ppmvd}$	Acrolein Concentration, ppmvd	< 0.34	< 0.35	< 0.38	< 0.36
$C_3H_4O_{lb/hr}$	Acrolein Emission Rate, lb/hr	< 0.130	< 0.132	< 0.142	< 0.135
$C_6H_6O_{\mu g/mL}$	Phenol Concentration in the Sample, µg/mL	< 0.25	< 0.25	< 0.25	< 0.25
Vol.	Volume of Sample Collected, mL	76	77	76	76
$C_6H_6O_{\mu g}$	Total Mass of Phenol in the Sample, µg	< 19.0	< 19.3	< 19.0	< 19.1
$C_6H_6O_{mg}$	Total Mass of Phenol in the Sample, mg	< 0.019	< 0.019	< 0.019	< 0.019
$C_6H_6O_{mg/dscm}$	Phenol Concentration in Air, mg/dscm	< 0.80	< 0.82	< 0.88	< 0.83
$C_6H_6O_{ppmvd}$	Phenol Concentration, ppmvd	< 0.20	< 0.21	< 0.22	< 0.21
$C_6H_6O_{lb/hr}$	Phenol Emission Rate, lb/hr	< 0.130	< 0.132	< 0.142	< 0.135
$CH_2O_{\mu g/mL}$	Formaldehyde Concentration in the Sample, µg/mL	< 0.05	< 0.05	0.12	< 0.07
Vol.	Volume of Sample Collected, mL	76	77	76	76
$CH_2O_{\mu g}$	Total Mass of Formaldehyde in the Sample, µg	< 3.80	< 3.85	9.12	< 5.59
CH_2O_{mg}	Total Mass of Formaldehyde in the Sample, mg	< 0.004	< 0.004	0.009	< 0.006
$CH_2O_{mg/dscm}$	Formaldehyde Concentration in Air, mg/dscm	< 0.16	< 0.16	0.42	< 0.25
CH_2O_{ppmvd}	Formaldehyde Concentration, ppmvd	< 0.13	< 0.13	0.34	< 0.20
$CH_2O_{lb/hr}$	Formaldehyde Emission Rate, lb/hr	< 0.026	< 0.026	0.068	< 0.040
$CH_2O_{lb/ODT}$	Formaldehyde Emission Rate, lb/ODT	< 0.009	< 0.009	0.024	< 0.014
$HAPS_{lb/hr}$	Total HAPS Emission Rate, lb/hr	< 0.130	< 0.132	< 0.209	< 0.157
$HAPS_{lb/ODT}$	Total HAPS Emission Rate, lb/ODT	< 0.045	< 0.047	< 0.073	< 0.055

For results below the reporting limit, half the reporting limit was used in the calculations.

Table 12. Dryer Vent #1 NCASI Method 99.02 Test Results – October 27, 2016, 2016 – Part 2

PERFORMANCE TEST PROCEDURES

Instrumental Analyzer Procedure

Stack gas concentrations of O_2 and CO_2 from the sources were measured with RM analyzers. These tests were performed in accordance with the applicable regulations, as outlined in Title 40, Part 60, Appendix A of the Code of Federal Regulations. All field data collected during the testing and photocopies of the actual O_2 and CO_2 1-minute averaging are provided in this report.

Sampling System

A gas sample was continuously extracted from the source with a stainless steel probe and channeled through a heated sample line to a gas sample conditioner. The entire sample extraction and delivery system was maintained at a temperature above 225°F to the point the sample enters the sample conditioner. The sample conditioner was employed to decrease the dewpoint of the gases to a repeatable, stable, low dew point. Condensed moisture was continuously removed from the sample conditioner by peristaltic pump and drained. The conditioned gas then traveled through a network of 3/4-inch Teflon® tubing to a manifold in the mobile laboratory. From the manifold, the sample was directed to a set of rotometers, where the flow of the sample gas into the analyzers was maintained at between 2.5 and 5 liters per minute (L/min).

Analyzer Calibration

The calibration of the instruments was performed using Protocol certified gas standards composed of a known concentration of the given component in nitrogen. A copy of the certification standards for each of the certified calibration gases used during the testing is included in Appendix C. All of the values obtained during the calibration process, including analyzer calibration, system bias analysis, and drift values, can be found in Appendix C of this report. The analyzer calibration procedures are identical, regardless of the constituent being evaluated by each analyzer. The range used for each analyzer was established based on the expected concentration levels of the flue gas stream.

The first step in the analyzer calibration was to set the zero point on the analyzer using nitrogen. The nitrogen is introduced directly to the back of each analyzer, and the zero potentiometer on the analyzer is adjusted until the proper output from the analyzer is realized. Next, a calibration gas is introduced to each analyzer, with a concentration within the appropriate range of the instrument. The span potentiometer on each analyzer is then adjusted until the output from the analyzer corresponds to the value of the calibration standard. Finally, final calibration standard with a concentration approximately one-half of the high-range calibration standard is used to determine the linearity of the analyzer within the given range. For certain constituents, more than one mid-range value is required. The specific requirements for each constituent are discussed later in this section.

Analyzer Calibration Error

The Analyzer Calibration Error (ACE) is the difference between the gas concentration exhibited by the gas analyzer and the concentration of the calibration gas when introduced directly to the analyzer. The maximum allowable variance for the zero, mid-range, and high-range calibration gases is ± 2% of the span. The calibration values and corresponding percent errors associated with this project can be found in Appendix C of this report, and is determined by the following equation for USEPA Method 3A.

$$ACE = \left(\frac{Analyzer\,Response - Cylinder\,Value}{Calibration\,Span} \right) x100$$

System Bias Check

Following the analyzer calibration procedure, a second test is required to determine the amount of bias the sampling system has on the calibration standard concentrations. In this procedure, the same calibration standards that were used to perform the analyzer calibration error test are introduced to the sampling system via a separate network of ¼-inch Teflon® tubing. The calibration gases are allowed to flood the system via a "t" connection at the end of the sample probe at a rate of approximately 2 L/min higher than the sample rate. The excess calibration gas flows out the tip of the probe, preventing stack gas from being drawn into the sampling system during calibrations. The gas is then drawn back through the system by the conditioning pumps, and is introduced to the analyzers. The output from the analyzers is recorded, without adjusting the zero or span potentiometers. The bias created by the sampling system is then determined by the following equation.

$$Bias = \left(\frac{System\,Response - Calibration\,Error\,Response}{Calibration\,Span} \right) x100$$

The maximum allowable system bias for any one analyzer is ±5% of the corresponding span value. The values determined for this portion of the calibration procedure can be found in Appendix C of this report.

Analyzer Drift

Utilizing the data obtained during the post-test bias check, a third test is performed to determine the amount of drift experienced during the test run. The analyzer response from the post-test system bias check is compared to the pre-test response for the same calibration standard for drift determinations. If the drift value is greater than the allowable value, the test run is considered invalid and the analyzers must be re-calibrated before continuing the test. The drift for each constituent is determined using the equation below.

$$Drift = \left(\frac{\left| Final\,System\,Calibration\,Response - Initial\,System\,Calibration\,Response \right|}{Calibration\,Span} \right) x100$$

The maximum allowable calibration drift for any one analyzer is 3% of the span over the period of each run. The values determined for this portion of the calibration procedure can be found in Appendix C of this report.

Stratification Test

A stratification test was performed in order to determine the minimum number of sample points required. The stratification was performed using a single sampling system. The difference between the concentrations measured during the time the sample system was at each point, and the mean average of the entire traverse period, was considered a variation due to process and used to normalize the traversed data. Following the normalization of the data, the absolute difference and the percent difference from the mean average was determined for each sample point. The results of the stratification test, with the tolerances of the stratification determinations are included in Appendix E.

Response Time

System response times for each analyzer were determined during the initial pretest bias prior to run number 1. The response time is determined by the length of time it takes the analyzer response to be within 95% or 0.5 ppm (whichever is less restrictive) of the certified gas concentration. The start of each run was a minimum of twice the response time following the completion of calibration checks.

USEPA Reference Methods

This section provides a detailed description of the individual USEPA Reference Methods employed in this test (40 CFR 60, Appendix A). Specifics for each analyzer utilized in this test program are presented in Appendix A.

USEPA Method 1: Sample and Velocity Traverses for Stationary Sources

Sampling traverse points were determined based on the ratio of the stack diameter to the upstream and downstream distances of the sampling plane to the closest disturbances. The minimum number of traverse points on the sampling plane is determined from Figure 1-2 and Table 1-2 of 40CFR60, Appendix A, Method 1. *(GOLDEN SOP: GSC-RM001)*

USEPA Method 2: Determination of Stack Gas Velocity and Volumetric Flow Rate (Type S Pitot Tube)

Velocity and volumetric flow rates were determined from the measurement of the stack gas velocity head with a Type-S Pitot tube and inclined manometer. The Pitot tube was constructed per USEPA Method 2 design specifications. Based on the face opening alignments, external tubing diameter, and base-to-opening plane distances, a coefficient value of 0.84 was assigned to the Pitot tube. *(GOLDEN SOP: GSC-RM002)*

USEPA Method 3: Molecular Weight (Integrated Bag)

USEPA Method 3 was performed to determine the molecular weight of the gas based on measurements of the concentration of oxygen (O_2) and carbon dioxide (CO_2) in the stack gas. Method 3A analyzers were used in lieu of the Orsat analyzer. O_2 was measured using a paramagnetic analyzer. CO_2 was measured using a non-dispersive infrared (NDIR) analyzer. During each test, an integrated bag of the sampled gas stream was collected and analyzed onsite. *(GOLDEN SOP: GSC-RM003)*

USEPA Method 4: Determination of Moisture Content in Stack Gases

USEPA Method 4 was performed independently, as well as inclusively with Methods 5/202 and NCASI 99.02 to measure the moisture content of the stack gas for calculating the volumetric flow rate and molecular weight on a dry basis. The impingers for each sample train were weighed before and after each run. *(GOLDEN SOP: GSC-RM004)*

USEPA Method 5/202: Filterable and Condensable Particulate Matter

USEPA Method 5 was combined with USEPA Method 202 to quantify FPM/CPM emissions reported as total particulate matter. The entire collected sample is considered to be less than PM_{10}. The gas was drawn from the stack through a glass nozzle and heated probe liner enclosed in a stainless steel sheath, through a pre-tared front-half filter, and into a Method 202 impinger train for collecting condensable particulate matter. The probe was equipped with type S pitot tubes for measuring gas velocity and a thermocouple sensor for measuring stack gas temperature. The thermocouple sensor was connected to a digital thermocouple indicator, which was used to measure the stack gas temperature at each sample point. The temperature of the probe liner was monitored to assure that condensation did not occur within the probe liner. The filter heating system utilized for this test was capable of maintaining a temperature around the filter holder during the sampling of 120±14°C (248±25°F). A temperature gauge capable of measuring temperature to within 3°C (5.4°F) is installed so that the temperature around the filter holder can be regulated and monitored during sampling. The nozzle, probe liner, and filter are often referred to as the "front-half" of

the sample train. Following the filter and probe was a condenser (impinger) section, which, by convention, is referred to as the "back-half."

The sample train was connected to a meter box by means of an umbilical cord, which contained a vacuum hose, pitot lines, thermocouple wires and a 4-wire electrical cord. The meter box was used to monitor stack conditions and to facilitate isokinetic sampling. The meter box consists of a leak-free pump used to pull the stack gas through the sample train, fine, and coarse metering valves to control the sampling rate, a vacuum gauge that measures the pressure drop from the sampling nozzle to the metering valves, and a calibrated dry gas meter readable to 0.001 cubic feet (ft^3). The dry gas meter inlet and outlet temperatures were monitored by thermocouples, which were connected to a multichannel thermocouple indicator. The dry gas meter calibration factor, Y, was determined by calibrating the meter against a wet test meter or calibrated dry gas meter. At the outlet of the dry gas meter was a calibrated orifice that was used to monitor the flow of gas through the metering system to assure that samples were collected isokinetically. The pressure drop across the orifice was monitored at each sample point. The pitot tubes utilized to measure stack gas velocity were connected to the control box via the umbilical cord. The control box contained either low and high range magnehelic gauges or an incline manometer, which were used for the velocity measurement.

A stack sample was drawn isokinetically from the stack through a glass nozzle and glass heated probe liner, through a tared front-half filter. Exiting the front-half filter was a water-jacketed coil condenser. The condenser sits atop a dry water dropout impinger equipped with a short stem so the sample gas stream cannot bubble through the condensing liquid. Following the water dropout impinger was a dry modified Greenburg-Smith type impinger. These two impingers sit in the water bath for the coil condenser that was maintained at ≤85 °F. When the sample gas stream exited the second impinger, it passed through the CPM filter holder containing a Zefluor ® membrane filter. Mounted in the exit to the CPM filter holder was a thermocouple in direct contact with the sample gas to ensure that it remains greater than 20 °C (>65 °F), but less than or equal to 30°C (≤85 °F) during the run. The third and fourth impingers were modified Greenburg-Smith impingers containing 100 mL of distilled deionized water and indicating silica gel respectively. These impingers are contained in an ice bath to maintain the gas temperature exiting the silica gel impinger <68 °F.

Following the post-test leak check, if any moisture had been collected in the first two impingers a purge of the sample train with ultra-pure nitrogen was performed. This was accomplished by leaving the impingers in the sample box and changing the stem on the water dropout impinger to a modified Greenburg-Smith bubbler type. If the tip of the bubbler did not extend below the surface of the collected liquid then a measured amount of degassed deionized, distilled ultra-filtered ASTM D1193-06, Type 1 water was added until the impinger tip was at least 1 centimeter below the surface of the liquid. The impingers were purged for 1 hour at a rate of 14 liters per minute or at the ΔH@ of the meter box. Once this is completed the impingers were weighed for moisture determination.

The front-half of the sample train was recovered with acetone per USEPA Method 5 procedures and the filterable particulate matter quantified gravimetrically after evaporation of the acetone and weighing of the front half filter. The back half of the sample train was recovered per Method 202 protocol. Any liquid from the first two impingers was recovered into Container No. 1. A dual rinsing with reagent water was conducted of all the glassware from the exit of the filterable particulate matter filter holder to the front half of the CPM filter

holder. These rinses were added to Container No. 1. The same glassware was then rinsed once with acetone and twice with hexane. These rinses were combined into a glass sample jar labeled Container No. 2. The CPM filter was recovered into Container No. 3. In the lab, the CPM filter was first extracted three times with water, with the extracts added to Container No. 1, and then three times with hexane, the extracts being added to Container No. 2. The contents of Container No. 1 were then extracted with hexane to obtain an organic phase which was added to Container No. 2. This organic fraction was evaporated to dryness at room temperature, and was desiccated and weighed to a constant weight. The remaining aqueous fraction from Container No. 1 was evaporated to ≥10 mL in an oven at 105°C and then allowed to dry at room temperature. This residue was redissolved in 100 mL of ultra-pure water and, if needed, titrated with ammonium hydroxide (NH_4OH) to neutralize the acid in the sample and remove the water of hydration. After titration to a pH of 7.0, the sample was dried using the previous two step process, desiccated and weighed to a final weight. *(GOLDEN SOPs: GSC-RM005 & GSC-RM202)*

USEPA Method 9: Opacity

Three (3), 18-minute opacity runs were performed on the Press Vent #1 East and West Vents. Opacity observations were made by a GOLDEN representative who currently is certified to read opacity. A copy of the observer's certificate is provided in Appendix C. *(GOLDEN SOP: GSC-RM009)*

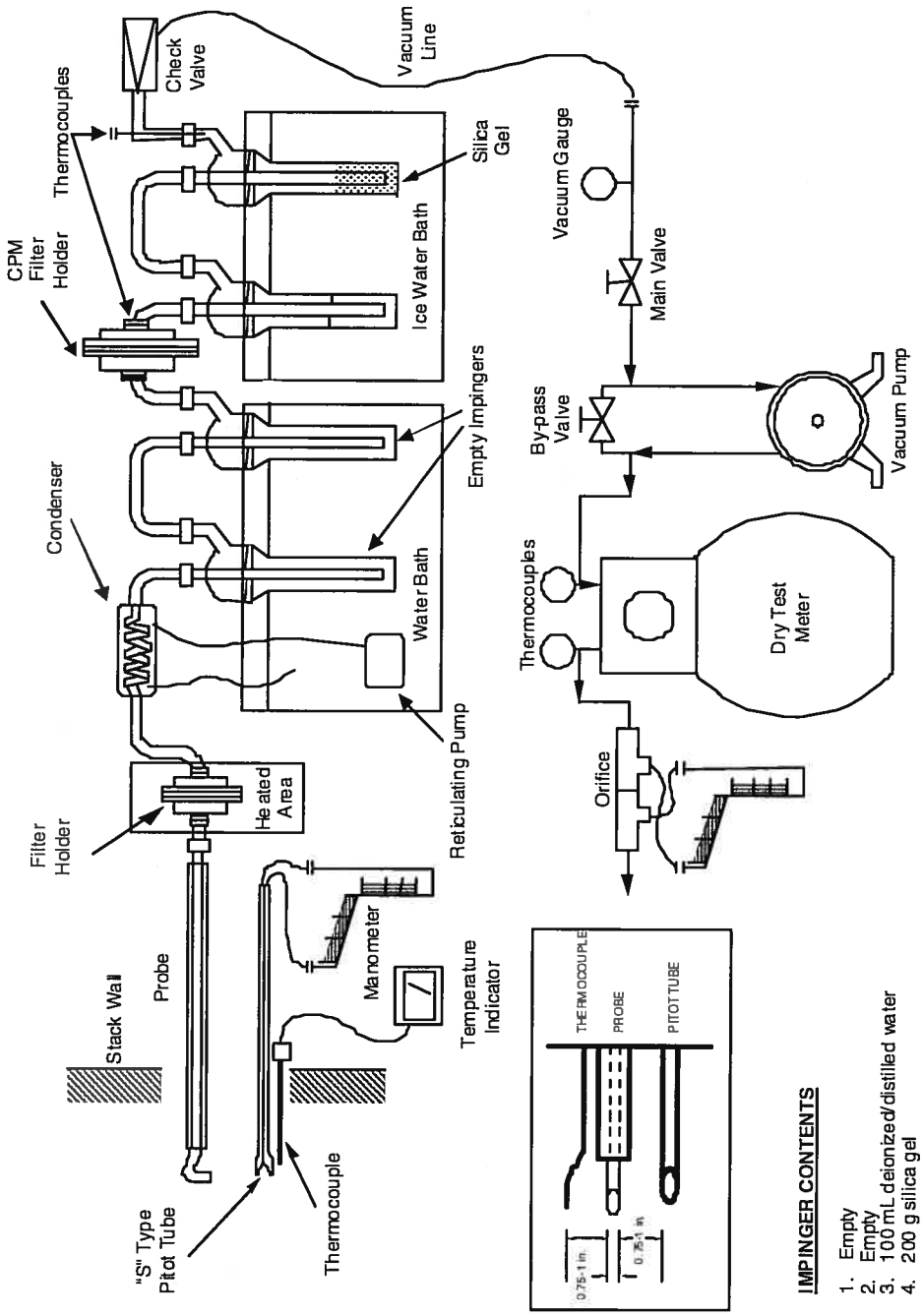


Figure 1. USEPA Method 5/202 Sampling Train

NCASI Method 99.02: Speciated HAPs from Wood Products Facilities

The NCASI Method 99.02 was performed to quantify emissions of speciated hazardous air pollutants (HAPs: acetaldehyde, propionaldehyde, methanol, acrolein, phenol, and formaldehyde) using a non-isokinetic sample train. The gas was drawn from the stack through a heated glass probe (maintained at 250 +/- 25°F), heated filter box (maintained at 250 +/- 25°F) containing teflon filter, unheated sample line, and three midget impingers each containing 25 mL of distilled water. The first impinger is equipped with a stem that has a frit on the end to improve gas/liquid contact. The following two impingers have regular tapered stems. The sampling rate was maintained at 400 +/- 100 mL/min using a VOST box.

As per the method requirements, the following QA checks were performed:

- One field blank for the testing program
- One duplicate sample per source.
- One run spike per source
- One field spike per source.
- One train spike for the testing program.
- One equipment blank for the testing program.

The detailed results of all the QA samples is provided in Appendix G. Samples were analyzed by the laboratory utilizing a GC/FID and a spectrophotometer.

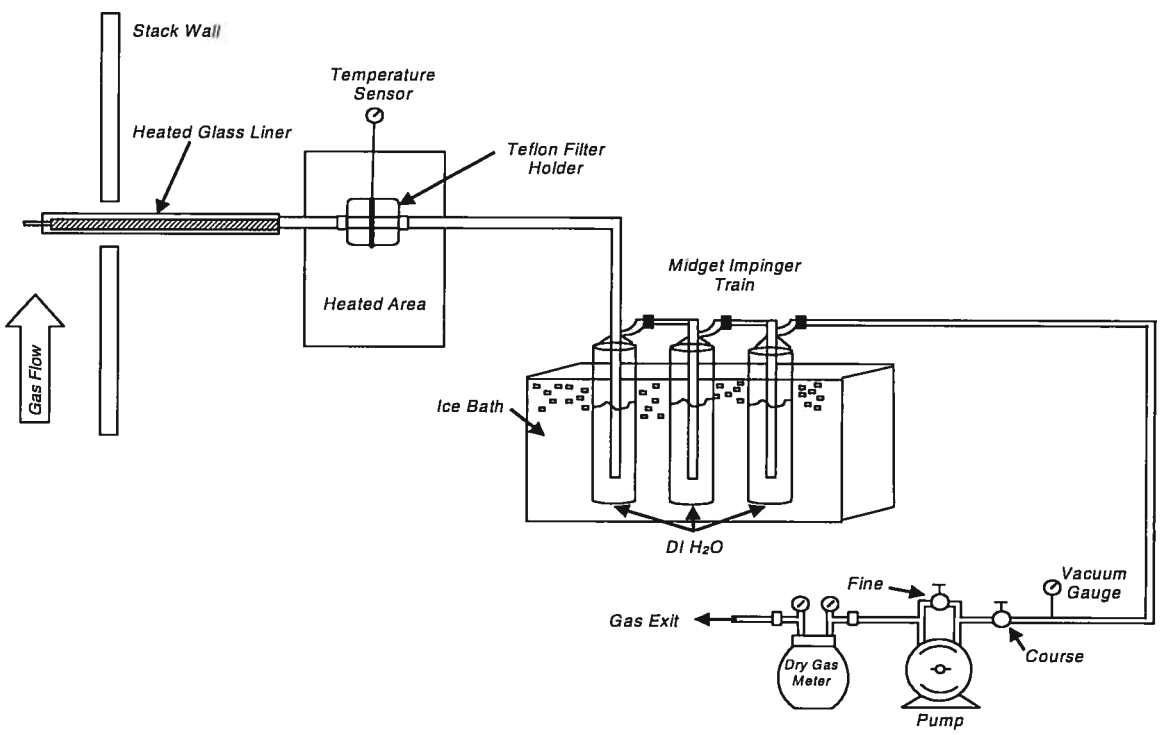


Figure 3. NCASI Method 99.02 Sampling Train

SOURCE INFORMATION

Process Tested

Parts that were used in previous stack testing were installed again, to support this project. The duct pictured was moved to Dryer Vent #1 pictured in Figure 4. Access for testing was via man lift. The ports are 3-inches with caps, one is vertical pointed downward, and the other is horizontal.

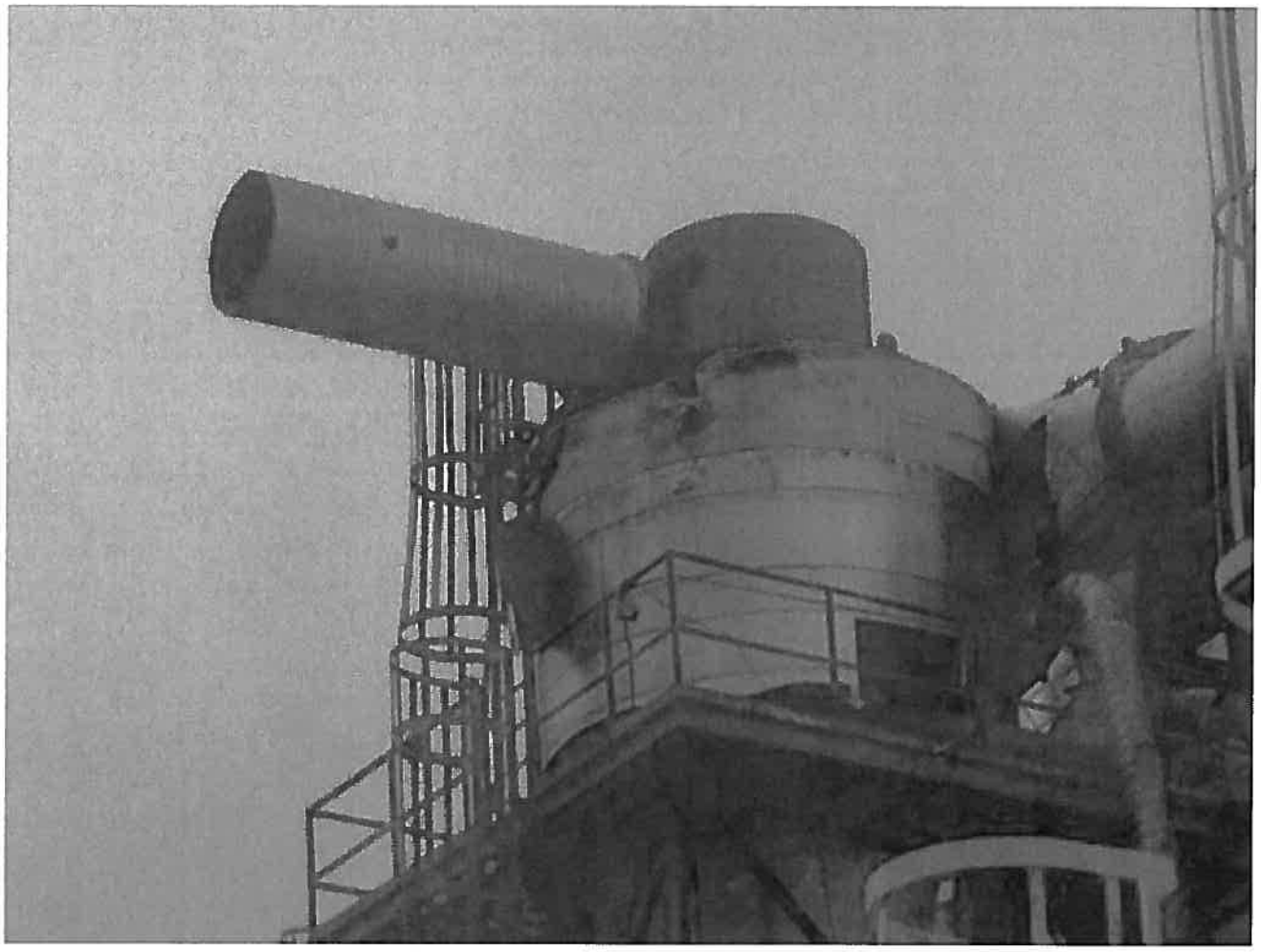


Figure 4. Dryer Cyclone with Extension

The duct pictured was attached to the Line Former #1 baghouse pictured in Figure 5. The ports are 4-inches with one vertical and one horizontal port.

Figure 5. Line Former #1 Baghouse with Extension

The two ducts pictured were attached to the two Press roof vents pictured in Figure 6. The ducts were supported horizontally on the roof. The test ports are 3-inches, and were oriented vertically and horizontally.

Figure 6. Press Vents with Extensions

SAMPLE CALCULATIONS

The following calculations were used in the determination of emission rates for the unit's exhaust.

Absolute Stack Gas Pressure (P_s)

$$P_s = P_{bar} + \frac{P_{static}}{13.6}$$

Where:

P_s = Absolute stack gas pressure (in. Hg)
P_{bar} = Barometric pressure (in. Hg)
P_{static} = Static pressure of stack gas (in. H_2O)

Gas Volume Sampled at Standard Conditions ($V_{m(std)}$)

$$V_{m(std)} = \left(\frac{528}{29.92}\right) x V_m x\, Y \left[\frac{P_{bar} + \left(\frac{\Delta H}{13.6}\right)}{T_m}\right]$$

Where:

$V_{m(std)}$ = Standard gas volume sampled (dscf)
V_m = Actual gas volume sampled (ft^3)
Y = Gas meter calibration factor
P_{bar} = Measured barometric pressure (in. Hg)
ΔH = Average orifice meter differential pressure (in. H_2O)
T_m = Absolute average meter temperature (°R)

Water Vapor Collected at Standard Conditions ($V_{w(std)}$)

$$V_{w(std)} = 0.04715\, x\, V_{lc}$$

Where:

$V_{w(std)}$ = Volume of water vapor (scf)
V_{lc} = Liquid collected in impingers (g)

Measured Stack Gas Moisture Content (B_{ws})

$$B_{ws} = \frac{V_{w(std)}}{\left(V_{w(std)} + V_{m(std)}\right)}$$

Where:
B_{ws} = *Stack moisture content*
$V_{w(std)}$ = *Volume of water vapor (scf)*
$V_{m(std)}$ = *Standard gas volume sampled (dscf)*

Wet Molecular Weight of Stack Gas

$$M_s = M_d\left(1 - B_{ws}\right) + 18B_{ws}$$

Where:
M_s = *Molecular weight of stack gas, wet basis (lb/lb-mole)*
M_d = *Molecular weight of stack gas, dry basis (lb/lb-mole)*
B_{ws} = *Stack moisture content*

Stack Gas Velocity

$$v_s = (85.49)(C_p)\left(avg\sqrt{\Delta P}\right)\sqrt{\frac{T_s}{(P_s)(M_s)}}$$

Where:
v_s = *Stack Gas Velocity (ft/sec)*
C_p = *Pitot coefficient (0.84)*
$avg\sqrt{\Delta P}$ = *Average square-root velocity head readings (in. H_2O)*
T_s = *Average stack temperature (°R)*
P_s = *Absolute stack gas pressure (in. Hg)*
M_s = *Molecular weight of stack gas, wet basis (lb/lb-mole)*

Volumetric Flow Rate (Actual cubic feet per min)

$$Q_{aw} = v_s \, x \, A_s \, x \, 60$$

Where:
Q_{aw} = *Volumetric flow rate (acfm)*
v_s = *Stack Gas Velocity (ft/sec)*
A_s = *Stack Area (ft^2)*

Volumetric Flow Rate (Standard Conditions, dry basis)

$$Q_{std} = \left(\frac{528}{29.92}\right) x (Q_{aw}) x \left(\frac{P_s}{T_s}\right) x (1 - B_{ws})$$

Where:

Q_{std} = Volumetric flow rate (dscfm)
P_s = Absolute stack gas pressure (in. Hg)
T_s = Average stack temperature (°R)
B_{ws} = Stack moisture content

Isokinetic Sampling Rate

$$I = \left(\frac{0.0945 x T_s x V_{m(std)}}{P_s x v_s x A_n x \theta x (1 - B_{ws})}\right)$$

Where:

T_s = Stack temperature (°R)
$V_{m(std)}$ = Sample volume at standard conditions (ft^3)
P_s = Absolute stack gas pressure
v_s = Stack gas velocity (fps)
A_n = Area of nozzle opening face (ft^3)
θ = Run time (minutes)
B_{ws} = Stack gas moisture content

Stack Gas Particulate Concentration (grains per dscf)

$$C_f = 0.01543 \ x \frac{m_n}{V_{m(std)}}$$

Where:

C_f = Particulate concentration (gr/dscf)
m_n = Total particulate collected in sample (mg)
$V_{m(std)}$ = Sample volume at standard conditions (ft^3)

Stack Gas Particulate Emission Rate (lb/hr)

$$E_f = \frac{C_s}{7000} x Q_{std} \ x 60$$

Where:

E_f = Emission rate (lb/hr)
C_f = Pollutant concentration (gr/dscf)
Q_{std} = Stack gas flow rate (dscfm)
60 = min/hr

Sample Volume at Standard Conditions (dscm)

$$V_{m(std)} = \frac{(V_m)(Y)(T_m)(P_{bar})}{(528)(29.92)}$$

Where:

V_{mstd} = Sample volume at standard conditions (m^3)
V_m = Actual gas volume sampled (L)
Y = Gas meter calibration factor
P_s = Absolute stack gas pressure (in. Hg)
T_m = Absolute average meter temperature (°R)
P_{bar} = Measured barometric pressure (in. Hg)

HAP Concentration (mg/dscm)

$$C_{tf} = C_m \div V_{m(std)}$$

Where:

C_{HAP} = HAP concentration (mg/dscm)
C_m = HAP mass (mg)
$V_{m(std)}$ = Standard gas volume sampled (dscm)

HAP Concentration (ppmvd)

$$C_{ppmvd} = \frac{C_{HAP} \; x \; 24.04}{MW}$$

HAP Concentration (lb/dscf)

$$C_d = C_{ppmvd} \left(\frac{MW \; (lb \,/\, lb \; mole)}{385.4 \; x \; 10^6} \right)$$

HAP Emission Rate (lb/hr)

$$E_r = (C_d \; x \; Q_{std} \; x \; 60) / 100,000$$

Where:

E_r = Emission rate (lb/hr)
C_d = Pollutant concentration (lb/dscf)
Q_{std} = Volumetric Flow rate (dscfm)

Emission Rate (lb/MSF)

$$E_{lb/MSF} = \frac{E_r}{(MSF \div \theta)}$$

Where:

$E_{lb/MSF}$ = Emission Rate (lb/MSF)
E_r = Pollutant emission rate (lb/hr)
MSF = Thousand square feet of board quantity based on ¾" basis
θ = Run time (minutes)

Emission Rate (tons/yr)

$$E_{tons/yr} = \frac{E_{lb/MSF}}{2{,}000} \; x \; (PD \; x \, 365)$$

Where:

$E_{tons/yr}$ = Emission Rate (tons/yr)
$E_{lb/MSF}$ = Emission Rate (lb/MSF)
PD = Production Limit (MSF/day)

Emission Rate (lb/ODT)

$$E_{lb/ODT} = \frac{E_r}{(ODT \div \theta)}$$

Where:

$E_{lb/ODT}$ = Emission Rate (lb/ODT)
E_r = Pollutant emission rate (lb/hr)
ODT = Oven dries tons
θ = Run time (minutes)

APPENDIX A – Testing Equipment

Testing Equipment

Provided in the Table 13 below is a list of all testing equipment used in the compliance testing at Neucor's wood products facility.

Golden Specialty, Inc.			
Trailer 2			
Constituent/ Method / Equipment	**Make / Model**	**Operating Range**	**Serial Number**
PM / Nozzles	Apex / Glass	NA	I.D. 0.3292 (glass-1) & 0.3235 (glass-2)
Velocity / Pitots	Apex / Type-S	0-10 in. H_2O	MW-5-1, MW-5-2, & TIM5-1
PM & Moisture/ Meter Box	Apex / XC-522	0-100%	RET-1
PM & Moisture/ Meter Box	Apex / XC-522	0-100%	CCI-1
HAPs / Meter Box	Clean Air Engineering / VOST	0-100%	VOST 1
HAPs / Meter Box	Clean Air Engineering / VOST	0-100%	VOST 2
HAPs / Meter Box	Clean Air Engineering / VOST	0-100%	VOST 3
O_2 / CO_2	CAI / 600	24.24 & 19.66 % vd	W12008-MZ

Table 13. Testing Equipment Used in the Compliance Testing

APPENDIX B – Resumes

SCOTT B. SWIGGARD, Ph.D. QSTI
PRESIDENT / TECHNICAL DIRECTOR

Professional Experience Summary

- Broad background in environmental compliance and regulatory issues. Has directed projects associated with air permitting, groundwater contamination, air toxins emissions control, hazardous materials control and reporting, wastewater process control (metals removal), energy conservation, industrial ventilation, noise control, bioremediation, and storm water control.
- Extensive background in emission testing, with over 1,600 tests personally conducted and/or supervised.
- Responsible for the continued development of testing capabilities and their research and development.
- Provides project management for testing at assigned client's facilities. Provides field support to the project managers on testing protocols and methods.
- Responsible for verification and validation on test data as part of a Quality Assurance/ Quality Control Program.

Selected Publications/Presentations

Swiggard, Scott and Spellicy, Robert, PhD., FTIR Monitoring in High Water and Carbon Dioxide Environments. Presented at the 2003 Air and Waste Management Association 96th Annual Conference and Exhibition, San Diego, CA, June 22-26, 2003.

Swiggard, Scott B., Comparative study of NH3 analysis and methods for SCR Slippage. Presented at Source Evaluation Society Annual Meeting, Kiawah Island, North Carolina, 2004

Swiggard, Scott B., Identifying In-Stack Detection Limits and Handling of Non-Detect Data, Presented at Source Evaluation Society Annual Meeting, Rohnert Park California, 2005

Swiggard, Scott B., Why Cooling Towers and Vents matter in Texas!, Presented at Source Evaluation Society Annual Meeting, Hilton Head North Carolina, 2006

Swiggard, Scott B., How accurate are your standards?, Presented at Source Evaluation Society Annual Meeting, Hilton Head North Carolina, 2006

Swiggard, Scott B., Bonnette Sidney, PhD., and Palomarez Jorge., Gas Chromatography (GC) Analysis of HRVOC's in Cooling Towers and Vents; including degradation 1,3-Butadiene in the presence of NOx compounds, Presented at the GAS2006 Conference, Galveston, Texas, April 2006

Swiggard, S., McCulloch, R. Stack Testing for Dummies®, Golden Specialty Edition. Indianapolis: Wiley Publishing, 2011.

Professional Affiliations

Source Evaluation Society (SES) – QSTI I-III #2006-025
Air and Waste Management Association (AWMA)
Source Testing Accreditation Council (STAC) – Member
ASTM International, Voting Member D22, #395691

RONALD B. McCULLOCH, M.S., MBA, QSTI

LOGISTICS AND BUSINESS DEVELOPMENT MANAGER / DEPUTY TECHNICAL DIRECTOR

Professional Work Summary

- Manages overall business operations for Golden Specialty operations outside the U.S. Gulf Coast
- Accomplished team leader with a track record of increasing financial and operational effectiveness by applying sound business strategy principles and a diverse industrial background.
- Experience base spans commercial laboratory, state government and environmental consulting for commercial and manufacturing clients.
- Core competencies include financial project management and reporting, budget management, program direction, strategic planning and process improvement.

Work Experience

Golden Specialty, Inc. (October 2010 – Present): Logistics and Business Development Manager / Deputy Technical Director

URS Corporation (July 2000 – October 2010): Account Manager / Senior Scientist

North Carolina Division of Air Quality (December 1994 – July 2000): QA Auditor / Lead Scientist

Compuchem Laboratories (August 1991 – December 1994): Staff Chemist

Selected Publications/Presentations

Robarge, W.P., Walker, J.T., McCulloch, R.B. and Murray, G. 2002. Atmospheric concentrations of ammonia and ammonium at an agricultural site in the southeast United States. *Atmospheric Environment.* 36:1661-1674.

McCulloch RB, Shendrikar AD. 2000. Concurrent atmospheric ammonia measurements using citric-acid-coated diffusion denuders and a chemiluminescence analyzer. *Atmospheric Environment* 34:4957-4958.

McCulloch, R.B., I Manufacture Widgets; Why Should I Care About Agricultural Emissions? *EM*, August 1999, 27-28.

McCulloch, R.B., G.S. Few, G.C. Murray, and V.P. Aneja, 1998, "Analysis of ammonia, ammonium aerosols, and acid gases in the atmosphere at a commercial hog farm in eastern North Carolina, USA," *Environmental Pollution*, Vol. 102, pp. 263-268.

Swiggard, S., McCulloch, R. Stack Testing for Dummies®, Golden Specialty Edition. Indianapolis: Wiley Publishing, 2011.

Professional Affiliations

Source Evaluation Society (SES): QSTI I-IV #2007-098
Air and Waste Management Association (A&WMA)

Education

Master of Business Administration (MBA), Colorado State University, Fort Collins, Colorado, 2009
M.S., Atmospheric Science, North Carolina State University, Raleigh, North Carolina, 1999
B.S., Chemistry, University of Central Florida, Orlando, Florida, 1991

Total Quality Management
Effective Leadership – NC Public Management Program
OSHA 40-hr Health and Safety Training
Win-Win Negotiations
Sarbanes-Oxley Compliance
RCRA Hazardous Waste Training for Managers
Client Account Managers Bootcamp

SHAMIT NAKRA, PhD, QI
PROJECT MANAGER

Professional Experience Summary

- Manages field projects for Golden Specialty operations in the Southwest Region.
- Environmental professional with extensive experience in working with regulatory authorities.
- Served as focal point for all plant environmental aspects related to air, water and waste.
- Worked extensively on solving air emission related issues for clients across North America.
- Prepared and submitted regulatory reports (NPRI, Toxic reduction Act, Greenhouse gas reporting, MISA reporting).
- Acted as liaison with provincial and federal regulatory agencies in regards to facility's environmental issues and ECA application.
- Completed AERMOD air dispersion modeling assessments to support regulatory compliance and capital project decisions.
- Knowledge of Environmental Policies, Regulations, and Law.
- Experience with EPA testing regulations, including 40 CFR, Part 60 and Part 75.
- Experienced with source compliance testing and emission sampling methodologies for stack gas velocity, moisture, and a variety of isokinetic (wet chemistry/particulate) testing.

Selected Publications/Presentations

Shamit Nakra and P.K. Andrew Hong, Rapid Extraction Method for Analysis of Sediment Contaminants, *Chemosphere*, 74 (2009), 1360-1366.

Shamit Nakra and P.K. Andrew Hong, Heightened Ozonation Treatment for remediation of PCB and PAH contaminated sediments, *Chemosphere*, 72 (2008), 1757-1764.

Shamit Nakra, Richard J. Green, and Scott L. Anderson, Thermal Decomposition of JP-10 studied by Micro-flowtube Pyrolysis-Mass Spectrometry, *Combustion and Flame*, 144 (2006), 662-674.

Work Experience

Golden Specialty, Inc. (2016 – Present)
Position: Project Manager

Cabot Canada (2012 – 2016)
Position: EHS Specialist

Lehder Environmental Services. (2010 – 2011)
Position: Senior Environmental Specialist

CCI Environmental Consultants. (2007 – 2010)
Position: Environmental Engineer

Professional Affiliations

Source Evaluation Society (SES): QI Groups I-IV

Education

PhD, Civil Engineering, University of Utah, 2008
M.S., Chemical Engineering, University of Utah, 2003
B.Tech., Chemical Engineering, Nagpur University, 2000

GOLDEN SPECIALTY

Air Quality Test Report

PAULA M. METZ, QSTI

REPORTS DEPARTMENT MANAGER

Professional Experience Summary

- Experience with EPA testing regulations, including 40 CFR, Part 60, Part 75, and Part 266, and TCEQ testing regulations, including 30TAC115, 30TAC117, and TCEQ Sampling Procedures Manual.
- Over 15 years of experience and participation in over 600 tests in Texas, Arkansas, Ohio, Mississippi, South Dakota, Iowa, Kansas, Louisiana and Michigan.
- CEM instrumentation projects include continuous analysis for carbon monoxide (CO), total oxides of nitrogen (NO_x), oxygen (O_2), carbon dioxide (CO_2), total hydrocarbons (THC), and sulfur dioxide (SO_2).
- Sampling experience includes flow stream characterization and monitoring of a number of types of flow streams for engineering purposes; including analysis using 3-D spherical probes per Method 2F, emissions sampling for regulatory compliance demonstration; emissions sampling for systems audit requirements of continuous emission monitoring systems (CEMS).
- Conducted isokinetic sampling and calculations for Methods 1, 1A, 2, 2A, 2F, 3, 3B, 4, and 5, including sample recovery, preservation, and storage at the test site with associate sample custody requirements for the methods listed.
- Knowledgeable in the testing requirements and procedures for the testing and analysis of Predictive Emissions Monitoring Systems (PEMS). Participated in several new source performance standards (NSPS) for development of new PEMS, including initial data collection of emissions.
- Experienced in modified El Paso Method, Appendix P, (Cooling Tower Sampling for Volatile Organic Compounds); applicable to monthly sampling and troubleshooting leaks in Process systems.
- Experienced in report writing, review, and finished product.

Work Experience

Golden Specialty, Inc. (February 2001 – Present)
Position: Reports Department Manager

Professional Affiliations

Source Evaluation Society (SES) – QSTI I-III #2006-026
Delta Mu Delta Honor Society (Capella University Xi Delta Chapter)

Education

B.S., Business Administration, Capella University, December 2015
Associate of Arts – Chemistry, San Jacinto Community College, December 2010
Visible Emissions Certified (EPA Method 9), 2004-2007
12 Hour Basic Instrumentation Training, California Analytical Instruments, January 2003
Source Sampling and CEMS Workshop, Walter Smith & Associates, 2002, 2003 and 2004
Preparation for the SES QSTI Exam Workshop, Walter Smith and Associates, 2005
SkillPath® Seminars, Employee Management and Supervision Workshop, 2003
Hazardous Materials Shipping Qualified, 2006
Man-Lift Training, August 2006
Fred Pryor®:Team Building Seminar, 2007
Fred Pryor®:Excel: Beyond the Basics" Seminar, 2007
Qualified Individual – Cylinder Gas Audits
Qualified Individual – EPA Method 30B
Qualified Individual – Portable Combustion Analyzer

HEATHER A. GONZALES

REPORTS CLERK

Professional Work Summary

- Ten years of data compilation and report generation experience for a variety departments and application.
- Prepared daily, weekly, monthly, quarterly and annual reports for financial decision makers.
- Responsible for documenting and maintaining the tracking of project data and test reports.
- Maintains documentation of equipment calibrations and certifications.
- In training for data importation for PEMS and CEMS RATAs, as well as multiple compliance and engineering test projects.
- In training for report writing, review and finished product.
- Proficient in Microsoft Word, Excel, Power Point and Access.

Work Experience

Golden Specialty, Inc. (September 2014 – Present)
Position: Reports Clerk

Wal-Mart Distribution Center (May 2005 – September 2014)
Position: Reports Clerk

Henderson State University (January 2002 – November 2004)
Position: Assistant Volleyball Coach

Education

Henderson State University – Special Education and Physical Education K-12
Certificate to Teach: Physical Education, Health, Algebra, and English, December 2004
Certificate to Coach: Volleyball and Basketball, December 2004
Lee College – Associate of Arts: Education K-12, 1999

GOLDEN SPECIALTY

Air Quality Test Report

AUSTIN M. KEOUGH, QI
ENVIRONMENTAL TECHNICIAN III

Professional Experience Summary

- Proficient in instrumentation methods: carbon monoxide (CO), total oxides of nitrogen (NO_x), oxygen (O_2), carbon dioxide (CO_2), total hydrocarbons (THC), and sulfur dioxide (SO_2).
- Proficient in EPA testing regulations, including 40 CFR Part 60 and Part 75.
- Proficient in source compliance testing and emission sampling methodologies for stack gas velocity, moisture, and a variety of isokinetic (wet chemistry/particulate) testing.
- Responsible for performing maintenance and calibrations on a variety of air testing equipment.
- Computer skills include: Microsoft© Office Suite, 3Point5.com, Adobe Photoshop Adobe Illustrator, Adobe Bridge, ArcGIS and AutoCAD.

Work Experience

Golden Specialty, Inc. (March 2014 – Present)
Position: Environmental Technician III

CCI Environmental Consultants (February 2014)
Position: Sample Technician

Backcountry.com (July 2012 – February 2014)
Position: Merchandise Processor II / Problem Solver

Professional Affiliations

Source Evaluation Society (SES): QI Groups I-IV

Education

B.A. Environmental Science, Willamette University, Salem, Oregon, 2012
Visible Emissions Evaluator, EPA Certification

GOLDEN SPECIALTY

Air Quality Test Report

JOSHUA D. TOTTEN, QI
ENVIRONMENTAL TECHNICIAN

Professional Experience Summary

- In training for instrumentation methods: carbon monoxide (CO), total oxides of nitrogen (NO_x), oxygen (O_2), carbon dioxide (CO_2), total hydrocarbons (THC), and sulfur dioxide (SO_2).
- In training of EPA testing regulations, including 40 CFR Part 60 and Part 75.
- In training for source compliance testing and emission sampling methodologies for stack gas velocity, moisture, and a variety of isokinetic (wet chemistry/particulate) testing.
- In training for performing maintenance and calibrations on a variety of air testing equipment.
- Computer skills include: Microsoft© Office Suite, ProNest and Hypertherm CNC/CAD software, ArcGIS, ArcMap, PCI Geomatica, AquiferTest

Work Experience

Golden Specialty, Inc. (November 2015 – Present)
Position: Environmental Technician

Superior Welding & Fabrication (June 2012 – November 2015)
Position: Welder/Fabricator/Painter/Driver

A-lert Construction (May 2007 - August 2009)
Position: Ironworker/Welder/Millwright

Blue Ridge Paper Products (April 2005 – June 2007)
Position: Printing Press Operator

Professional Affiliations

Source Evaluation Society (SES) – QI Groups I & III

Education

B.S. Environmental Sciences, University of Iowa, Iowa City, IA, 2015
A.S. Physics, Clinton Community College, Clinton, IA, 2011
A.A. Liberal Arts, Clinton Community College, Clinton, IA, 2010

GOLDEN SPECIALTY

Air Quality Test Report

JOHN W. HATHAWAY
ENVIRONMENTAL TECHNICIAN IN TRAINING

Professional Work Summary

- In training for instrumentation methods: carbon monoxide (CO), total oxides of nitrogen (NO_x), oxygen (O_2), carbon dioxide (CO_2), total hydrocarbons (THC), and sulfur dioxide (SO_2).
- In training for EPA testing regulations, including 40 CFR Part 60 and Part 75.
- In training for source compliance testing and emission sampling methodologies for stack gas velocity, moisture, and a variety of isokinetic (wet chemistry/particulate) testing.
- Responsible for performing maintenance and calibrations on a variety of air testing equipment.
- Computer skills include: Microsoft© Office Suite, PowerPoint, CAD, and Prezi

Work Experience

Golden Specialty, Inc. (*October 2016 – Present*)
Position: Environmental Technician in Training

Itek Energy (*February 2016 – June 2016*)
Position: Technical Administrative Assistant

Itek Energy (*January 2014 – January 2016*)
Position: Solar Panel Assembler

Western Washington University (*March 2015 – June 2016*)
Position: Energy Research Assistant

Education

Bachelor of Science in Environmental Science, Western Washington University, Bellingham, WA, 2016

APPENDIX C – Calibration Data

Analyzer Calibration Error

Test Performed For:
Neucor
Press Vents
White Swan
O2-CO2
Date:10/25/16

Test Performed By:
Golden Specialty
Northwest
CEMS
AK / SN/JH/JA
Run 1

Oxygen Monitor

Method 3A

Analyzer Model: CAI 600
Serial Number: W12008-MZ

Calibration Span: 24.24 %

Cylinder Number	Reference Gas Concentration	Analyzer Response	Difference	Calibration Error	Error Type
CEMS N2/cg7	0.00 %	0.03 %	-0.03 %	-0.13	%
CC94266/cg6	10.00 %	9.85 %	0.15 %	0.64	%
EB0061480/cg5	24.24 %	24.08 %	0.16 %	0.66	%

Carbon Dioxide Monitor

Method 3A

Analyzer Model: CAI 600
Serial Number: W12008-MZ

Calibration Span: 19.66 %

Cylinder Number	Reference Gas Concentration	Analyzer Response	Difference	Calibration Error	Error Type
CEMS N2/cg7	0.00 %	0.08 %	-0.08 %	-0.38	%
CC94266/cg6	10.98 %	10.91 %	0.07 %	0.34	%
EB0061480/cg5	19.66 %	19.59 %	0.07 %	0.37	%

Sampling System Bias and Drift

Test Performed For:
Neucor
Press Vents
White Swan
O2-CO2
Date:10/25/16

Test Performed By:
Golden Specialty
Northwest
CEMS
AK / SN/JH/JA
Run 1
10:35:15 12:40:15

Oxygen Analyzer

Response Time:
Model: CAI 600
Calibration Span: 24.24 %
Serial Number: W12008-MZ

Gas Level	Direct Gas Value	Initial Response	Initial Bias	Final Response	Final Bias	Total Run Drift
Low O_2	0.03 %	-0.02 %	-0.23 %	0.00 %	-0.13 %	0.10 %
Upscale O_2	9.85 %	9.82 %	-0.11 %	9.81 %	-0.13 %	-0.02 %

Carbon Dioxide Analyzer

Response Time:
Model: CAI 600
Calibration Span: 19.66 %
Serial Number: W12008-MZ

Gas Level	Direct Gas Value	Initial Response	Initial Bias	Final Response	Final Bias	Total Run Drift
Low CO_2	0.08 %	0.10 %	0.11 %	0.13 %	0.29 %	0.18 %
Upscale CO_2	10.91 %	10.97 %	0.28 %	10.84 %	-0.40 %	-0.13 %

Sampling System Bias and Drift

Test Performed For:
Neucor
Press Vents
White Swan
O2-CO2
Date:10/25/16

Test Performed By:
Golden Specialty
Northwest
CEMS
AK / SN/JH/JA
Run 2
17:19:45 19:24:45

Oxygen Analyzer

Response Time: Model: CAI 600
Calibration Span: 24.24 % Serial Number: W12008-MZ

Gas Level	Direct Gas Value	Initial Response	Initial Bias	Final Response	Final Bias	Total Run Drift
Low O_2	0.03 %	-0.02 %	-0.23 %	0.00 %	-0.13 %	0.10 %
Upscale O_2	9.85 %	9.82 %	-0.11 %	9.81 %	-0.13 %	-0.02 %

Carbon Dioxide Analyzer

Response Time: Model: CAI 600
Calibration Span: 19.66 % Serial Number: W12008-MZ

Gas Level	Direct Gas Value	Initial Response	Initial Bias	Final Response	Final Bias	Total Run Drift
Low CO_2	0.08 %	0.10 %	0.11 %	0.13 %	0.29 %	0.18 %
Upscale CO_2	10.91 %	10.97 %	0.28 %	10.84 %	-0.40 %	-0.13 %

Analyzer Calibration Error

Test Performed For:
Neucor
Press Vents
White Swan
O2-CO2
Date:10/26/16

Test Performed By:
Golden Specialty
Northwest
CEMS
AK / SN/JH/JA
Run 1

Oxygen Monitor

Method 3A

Analyzer Model: CAI 600
Serial Number: W12008-MZ

Calibration Span: 24.24 %

Cylinder Number	Reference Gas Concentration	Analyzer Response	Difference	Calibration Error	Error Type
CEMS N2/cg7	0.00 %	-0.03 %	0.03 %	0.12	%
CC94266/cg6	10.00 %	9.88 %	0.13 %	0.52	%
EB0061480/cg5	24.24 %	24.10 %	0.14 %	0.58	%

Carbon Dioxide Monitor

Method 3A

Analyzer Model: CAI 600
Serial Number: W12008-MZ

Calibration Span: 19.66 %

Cylinder Number	Reference Gas Concentration	Analyzer Response	Difference	Calibration Error	Error Type
CEMS N2/cg7	0.00 %	-0.12 %	0.12 %	0.60	%
CC94266/cg6	10.98 %	10.87 %	0.11 %	0.57	%
EB0061480/cg5	19.66 %	19.54 %	0.12 %	0.62	%

Sampling System Bias and Drift

Test Performed For:
Neucor
Press Vents
White Swan
O2-CO2
Date:10/26/16

Test Performed By:
Golden Specialty
Northwest
CEMS
AK / SN/JH/JA
Run 1
8:11:15 10:16:15

Oxygen Analyzer

Response Time:
Model: CAI 600
Calibration Span: 24.24 %
Serial Number: W12008-MZ

Gas Level	Direct Gas Value	Initial Response	Initial Bias	Final Response	Final Bias	Total Run Drift
Low O_2	-0.03 %	-0.03 %	0.00 %	-0.03 %	-0.01 %	-0.01 %
Upscale O_2	9.88 %	9.82 %	-0.23 %	9.83 %	-0.18 %	0.05 %

Carbon Dioxide Analyzer

Response Time:
Model: CAI 600
Calibration Span: 19.66 %
Serial Number: W12008-MZ

Gas Level	Direct Gas Value	Initial Response	Initial Bias	Final Response	Final Bias	Total Run Drift
Low CO_2	-0.12 %	-0.06 %	0.31 %	-0.09 %	0.14 %	-0.17 %
Upscale CO_2	10.87 %	10.86 %	-0.05 %	10.68 %	-0.95 %	-0.18 %

Sampling System Bias and Drift

Test Performed For:
Neucor
Press Vents
White Swan
O2-CO2
Date:10/26/16

Test Performed By:
Golden Specialty
Northwest
CEMS
AK / SN/JH/JA
Run 2
12:25:15 13:25:15

Oxygen Analyzer

Response Time:
Model: CAI 600
Calibration Span: 24.24 %
Serial Number: W12008-MZ

Gas Level	Direct Gas Value	Initial Response	Initial Bias	Final Response	Final Bias	Total Run Drift
Low O_2	-0.03 %	-0.03 %	0.00 %	-0.03 %	-0.01 %	-0.01 %
Upscale O_2	9.88 %	9.82 %	-0.23 %	9.83 %	-0.18 %	0.05 %

Carbon Dioxide Analyzer

Response Time:
Model: CAI 600
Calibration Span: 19.66 %
Serial Number: W12008-MZ

Gas Level	Direct Gas Value	Initial Response	Initial Bias	Final Response	Final Bias	Total Run Drift
Low CO_2	-0.12 %	-0.06 %	0.31 %	-0.09 %	0.14 %	-0.17 %
Upscale CO_2	10.87 %	10.86 %	-0.05 %	10.68 %	-0.95 %	-0.18 %

Sampling System Bias and Drift

Test Performed For:
Neucor
Press Vents
White Swan
O2-CO2
Date:10/26/16

Test Performed By:
Golden Specialty
Northwest
CEMS
AK / SN/JH/JA
Run 3
14:49:15 15:49:15

Oxygen Analyzer

Response Time: Model: CAI 600
Calibration Span: 24.24 % Serial Number: W12008-MZ

Gas Level	Direct Gas Value	Initial Response	Initial Bias	Final Response	Final Bias	Total Run Drift
Low O_2	-0.03 %	-0.03 %	0.00 %	-0.03 %	-0.01 %	-0.01 %
Upscale O_2	9.88 %	9.82 %	-0.23 %	9.83 %	-0.18 %	0.05 %

Carbon Dioxide Analyzer

Response Time: Model: CAI 600
Calibration Span: 19.66 % Serial Number: W12008-MZ

Gas Level	Direct Gas Value	Initial Response	Initial Bias	Final Response	Final Bias	Total Run Drift
Low CO_2	-0.12 %	-0.06 %	0.31 %	-0.09 %	0.14 %	-0.17 %
Upscale CO_2	10.87 %	10.86 %	-0.05 %	10.68 %	-0.95 %	-0.18 %

Sampling System Bias and Drift

Test Performed For:
Neucor
Press Vents
White Swan
O2-CO2
Date:10/26/16

Test Performed By:
Golden Specialty
Northwest
CEMS
AK / SN/JH/JA
Run 4
16:27:15 17:27:15

Oxygen Analyzer

Response Time: Model: CAI 600
Calibration Span: 24.24 % Serial Number: W12008-MZ

Gas Level	Direct Gas Value	Initial Response	Initial Bias	Final Response	Final Bias	Total Run Drift
Low O_2	-0.03 %	-0.03 %	0.00 %	-0.03 %	-0.01 %	-0.01 %
Upscale O_2	9.88 %	9.82 %	-0.23 %	9.83 %	-0.18 %	0.05 %

Carbon Dioxide Analyzer

Response Time: Model: CAI 600
Calibration Span: 19.66 % Serial Number: W12008-MZ

Gas Level	Direct Gas Value	Initial Response	Initial Bias	Final Response	Final Bias	Total Run Drift
Low CO_2	-0.12 %	-0.06 %	0.31 %	-0.09 %	0.14 %	-0.17 %
Upscale CO_2	10.87 %	10.86 %	-0.05 %	10.68 %	-0.95 %	-0.18 %

Analyzer Calibration Error

Test Performed For:
Neucor
Press Vents
White Swan
O2-CO2
Date:10/27/16

Test Performed By:
Golden Specialty
Northwest
CEMS
AK / SN/JH/JA
Run 1

Oxygen Monitor

Method 3A

Analyzer Model: CAI 600
Serial Number: W12008-MZ

Calibration Span: 24.24 %

Cylinder Number	Reference Gas Concentration	Analyzer Response	Difference	Calibration Error	Error Type
CEMS N2/cg7	0.00 %	-0.06 %	0.06 %	0.25	%
CC94266/cg6	10.00 %	9.82 %	0.18 %	0.76	%
EB0061480/cg5	24.24 %	24.03 %	0.21 %	0.87	%

Carbon Dioxide Monitor

Method 3A

Analyzer Model: CAI 600
Serial Number: W12008-MZ

Calibration Span: 19.66 %

Cylinder Number	Reference Gas Concentration	Analyzer Response	Difference	Calibration Error	Error Type
CEMS N2/cg7	0.00 %	0.10 %	-0.10 %	-0.50	%
CC94266/cg6	10.98 %	11.09 %	-0.11 %	-0.57	%
EB0061480/cg5	19.66 %	19.77 %	-0.11 %	-0.57	%

Sampling System Bias and Drift

Test Performed For:
Neucor
Press Vents
White Swan
O2-CO2
Date:10/27/16

Test Performed By:
Golden Specialty
Northwest
CEMS
AK / SN/JH/JA
Run 1
9:03:15 10:03:15

Oxygen Analyzer

Calibration Span: 24.24 %

Response Time:

Serial Number: W12008-MZ

Model: CAI 600

Gas Level	Direct Gas Value	Initial Response	Initial Bias	Final Response	Final Bias	Total Run Drift
Low O_2	-0.06 %	-0.08 %	-0.07 %	-0.06 %	0.00 %	0.07 %
Upscale O_2	9.82 %	9.76 %	-0.24 %	9.78 %	-0.16 %	0.07 %

Carbon Dioxide Analyzer

Calibration Span: 19.66 %

Response Time:

Serial Number: W12008-MZ

Model: CAI 600

Gas Level	Direct Gas Value	Initial Response	Initial Bias	Final Response	Final Bias	Total Run Drift
Low CO_2	0.10 %	0.15 %	0.24 %	0.13 %	0.15 %	-0.10 %
Upscale CO_2	11.09 %	11.08 %	-0.07 %	10.91 %	-0.93 %	-0.17 %

Sampling System Bias and Drift

Test Performed For:
Neucor
Press Vents
White Swan
O2-CO2
Date:10/27/16

Test Performed By:
Golden Specialty
Northwest
CEMS
AK / SN/JH/JA
Run 2
10:27:15 11:27:15

Oxygen Analyzer

Response Time: Model: CAI 600
Calibration Span: 24.24 % Serial Number: W12008-MZ

Gas Level	Direct Gas Value	Initial Response	Initial Bias	Final Response	Final Bias	Total Run Drift
Low O_2	-0.06 %	-0.08 %	-0.07 %	-0.06 %	0.00 %	0.07 %
Upscale O_2	9.82 %	9.76 %	-0.24 %	9.78 %	-0.16 %	0.07 %

Carbon Dioxide Analyzer

Response Time: Model: CAI 600
Calibration Span: 19.66 % Serial Number: W12008-MZ

Gas Level	Direct Gas Value	Initial Response	Initial Bias	Final Response	Final Bias	Total Run Drift
Low CO_2	0.10 %	0.15 %	0.24 %	0.13 %	0.15 %	-0.10 %
Upscale CO_2	11.09 %	11.08 %	-0.07 %	10.91 %	-0.93 %	-0.17 %

Sampling System Bias and Drift

Test Performed For:
Neucor
Press Vents
White Swan
O2-CO2
Date:10/27/16

Test Performed By:
Golden Specialty
Northwest
CEMS
AK / SN/JH/JA
Run 3
11:47:15 12:47:15

Oxygen Analyzer

Response Time: Model: CAI 600
Calibration Span: 24.24 % Serial Number: W12008-MZ

Gas Level	Direct Gas Value	Initial Response	Initial Bias	Final Response	Final Bias	Total Run Drift
Low O_2	-0.06 %	-0.08 %	-0.07 %	-0.06 %	0.00 %	0.07 %
Upscale O_2	9.82 %	9.76 %	-0.24 %	9.78 %	-0.16 %	0.07 %

Carbon Dioxide Analyzer

Response Time: Model: CAI 600
Calibration Span: 19.66 % Serial Number: W12008-MZ

Gas Level	Direct Gas Value	Initial Response	Initial Bias	Final Response	Final Bias	Total Run Drift
Low CO_2	0.10 %	0.15 %	0.24 %	0.13 %	0.15 %	-0.10 %
Upscale CO_2	11.09 %	11.08 %	-0.07 %	10.91 %	-0.93 %	-0.17 %

Sampling System Bias and Drift

Test Performed For:
Neucor
Press Vents
White Swan
O2-CO2
Date:10/27/16

Test Performed By:
Golden Specialty
Northwest
CEMS
AK / SN/JH/JA
Run 4
14:33:15 15:33:15

Oxygen Analyzer

Calibration Span: 24.24 %

Response Time:

Serial Number: W12008-MZ

Model: CAI 600

Gas Level	Direct Gas Value	Initial Response	Initial Bias	Final Response	Final Bias	Total Run Drift
Low O_2	-0.06 %	-0.08 %	-0.07 %	-0.06 %	0.00 %	0.07 %
Upscale O_2	9.82 %	9.76 %	-0.24 %	9.78 %	-0.16 %	0.07 %

Carbon Dioxide Analyzer

Calibration Span: 19.66 %

Response Time:

Serial Number: W12008-MZ

Model: CAI 600

Gas Level	Direct Gas Value	Initial Response	Initial Bias	Final Response	Final Bias	Total Run Drift
Low CO_2	0.10 %	0.15 %	0.24 %	0.13 %	0.15 %	-0.10 %
Upscale CO_2	11.09 %	11.08 %	-0.07 %	10.91 %	-0.93 %	-0.17 %

Sampling System Bias and Drift

Test Performed For:
Neucor
Press Vents
White Swan
O2-CO2
Date:10/27/16

Test Performed By:
Golden Specialty
Northwest
CEMS
AK / SN/JH/JA
Run 5
16:20:15 17:20:15

Oxygen Analyzer

Calibration Span: 24.24 %

Response Time:

Serial Number: W12008-MZ

Model: CAI 600

Gas Level	Direct Gas Value	Initial Response	Initial Bias	Final Response	Final Bias	Total Run Drift
Low O_2	-0.06 %	-0.08 %	-0.07 %	-0.06 %	0.00 %	0.07 %
Upscale O_2	9.82 %	9.76 %	-0.24 %	9.78 %	-0.16 %	0.07 %

Carbon Dioxide Analyzer

Calibration Span: 19.66 %

Response Time:

Serial Number: W12008-MZ

Model: CAI 600

Gas Level	Direct Gas Value	Initial Response	Initial Bias	Final Response	Final Bias	Total Run Drift
Low CO_2	0.10 %	0.15 %	0.24 %	0.13 %	0.15 %	-0.10 %
Upscale CO_2	11.09 %	11.08 %	-0.07 %	10.91 %	-0.93 %	-0.17 %

Sampling System Bias and Drift

Test Performed For:
Neucor
Press Vents
White Swan
O2-CO2
Date:10/27/16

Test Performed By:
Golden Specialty
Northwest
CEMS
AK / SN/JH/JA
Run 6
17:49:15 18:49:15

Oxygen Analyzer

Response Time: Model: CAI 600
Calibration Span: 24.24 % Serial Number: W12008-MZ

Gas Level	Direct Gas Value	Initial Response	Initial Bias	Final Response	Final Bias	Total Run Drift
Low O_2	-0.06 %	-0.08 %	-0.07 %	-0.06 %	0.00 %	0.07 %
Upscale O_2	9.82 %	9.76 %	-0.24 %	9.78 %	-0.16 %	0.07 %

Carbon Dioxide Analyzer

Response Time: Model: CAI 600
Calibration Span: 19.66 % Serial Number: W12008-MZ

Gas Level	Direct Gas Value	Initial Response	Initial Bias	Final Response	Final Bias	Total Run Drift
Low CO_2	0.10 %	0.15 %	0.24 %	0.13 %	0.15 %	-0.10 %
Upscale CO_2	11.09 %	11.08 %	-0.07 %	10.91 %	-0.93 %	-0.17 %

Airgas

CERTIFICATE OF ANALYSIS

Grade of Product: EPA Protocol

Airgas Specialty Gases
11711 S. Alameda Street
Los Angeles , CA 90059
323-568-2208 Fax: 323-567-3686
www.airgas.com

Part Number:	E03NI56E15A38L8	Reference Number:	48-124468308-1
Cylinder Number:	EB0061480	Cylinder Volume:	160.0 Cubic Feet
Laboratory:	ASG - Los Angeles - CA	Cylinder Pressure:	2015 PSIG
PGVP Number:	B32014	Valve Outlet:	296
Gas Code:	CO2,O2,BALN	Certification Date:	Dec 19, 2014

Expiration Date: Dec 19, 2022

Certification performed in accordance with "EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards (May 2012)" document EPA 600/R-12/531, using the assay procedures listed. Analytical Methodology does not require correction for analytical interference. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a volume/volume basis unless otherwise noted.

Do Not Use This Cylinder below 100 psig, i.e. 0.7 megapascals.

ANALYTICAL RESULTS

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
CARBON DIOXIDE	19.75 %	19.66 %	G1	+/- 0.6% NIST Traceable	12/19/2014
OXYGEN	24.25 %	24.24 %	G2	+/- 0.5% NIST Traceable	12/19/2014
NITROGEN	Balance				

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
NTRM	13060814	CC416638	24.04 % CARBON DIOXIDE/NITROGEN	+/- 0.6%	May 16, 2019
NTRM	09061424	CC273756	22.53 % OXYGEN/NITROGEN	+/- 0.4%	Mar 08, 2019

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
SIEMENS 6E CO2	NDIR	Dec 18, 2014
SIEMENS OXYMAT 6	PARAMAGNETIC	Dec 15, 2014

Triad Data Available Upon Request

Approved for Release

Airgas
an Air Liquide company

Airgas Specialty Gases
Airgas USA, LLC
525 North Industrial Loop Road
Tooele, UT 84074
Airgas.com

CERTIFICATE OF ANALYSIS

Grade of Product: EPA Protocol

Part Number:	E03NI79E15A0PK1	Reference Number:	153-124553255-1
Cylinder Number:	CC94266	Cylinder Volume:	151.6 CF
Laboratory:	124 - Tooele - UT	Cylinder Pressure:	2015 PSIG
PGVP Number:	B72016	Valve Outlet:	590
Gas Code:	CO2,O2,BALN	Certification Date:	May 06, 2016

Expiration Date: May 06, 2024

Certification performed in accordance with "EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards (May 2012)" document EPA 600/R-12/531, using the assay procedures listed. Analytical Methodology does not require correction for analytical interference. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a volume/volume basis unless otherwise noted.

Do Not Use This Cylinder below 100 psig, i.e. 0.7 megapascals.

ANALYTICAL RESULTS

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
OXYGEN	10.00 %	10.00 %	G1	+/- 1.0% NIST Traceable	05/06/2016
CARBON DIOXIDE	11.00 %	10.98 %	G1	+/- 1.0% NIST Traceable	05/06/2016
NITROGEN	Balance				

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
NTRM	06120104	CC195919	9.898 % OXYGEN/NITROGEN	1%	Jul 26, 2018
NTRM	1	CC413742	16.939 % CARBON DIOXIDE/NITROGEN	0.60	May 08, 2019

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
Horiba VIA-510 SV4MEUTJ CO2	CO2 NDIR (Dixon)	Apr 29, 2016
Horiba MPA-510 W603MM58 O2	O2 Paramagnetic (Mason)	Apr 29, 2016

Triad Data Available Upon Request

Signature on file

Approved for Release

GREEN SPECIALTY

FORM# GSC-TM017-003
REV 2012-01, EFF 7/31/12

NOZZLE INSPECTION AND MEASUREMENT DATA SHEET

EPA Method 5, Section 10.1
Probe Nozzle. Probe nozzles shall be calibrated before their initial use in the field. Using a micrometer, measure the ID of the nozzle to the nearest 0.025 mm (0.001 in.). Make three separate measurements using different diameters each time, and obtain the average of the measurements. The difference between the high and low numbers shall not exceed 0.1 mm (0.004 in.). When nozzles become nicked, dented, or corroded, they shall be reshaped, sharpened, and recalibrated before use. Each nozzle shall be permanently and uniquely identified.

Nozzle Number: glass - 1

Measure three diameters as shown; measurement is in inches; record below; perform calculation.*

1. 0.3292 2. 0.3292 3. 0.3292

Average Diameter: 0.3292

Area = $\frac{\pi D^2}{4 \times 144}$ = ~~0.001797~~ 0.000591 ft^2 SM 10/23/16

This area shall be used in data reduction.

I hereby certify that the above referenced nozzle appears to be round, sharp-edged, free of nicks and dents and is judged acceptable for use at this time.

Signature

10/25/16

Date

*Maximum allowable difference between Largest diameter and smallest diameter is 0.004 inches

SPECIALTY

FORM# GSC-TM017-003
REV 2012-01, EFF 7/31/12

NOZZLE INSPECTION AND MEASUREMENT DATA SHEET

EPA Method 5, Section 10.1
Probe Nozzle. Probe nozzles shall be calibrated before their initial use in the field. Using a micrometer, measure the ID of the nozzle to the nearest 0.025 mm (0.001 in.). Make three separate measurements using different diameters each time, and obtain the average of the measurements. The difference between the high and low numbers shall not exceed 0.1 mm (0.004 in.). When nozzles become nicked, dented, or corroded, they shall be reshaped, sharpened, and recalibrated before use. Each nozzle shall be permanently and uniquely identified.

Nozzle Number: glass -2

Measure three diameters as shown; measurement is in inches; record below; perform calculation.*

1. 0.3235 2. 0.3235 3. 0.3235

Average Diameter: 0.3235

SW 10/25/16

Area = $\frac{\pi D^2}{4 \times 144}$ = ~~0.001764~~ 0.000571 ft^2

This area shall be used in data reduction.

I hereby certify that the above referenced nozzle appears to be round, sharp-edged, free of nicks and dents and is judged acceptable for use at this time.

Signature

10/25/16
Date

*Maximum allowable difference between Largest diameter and smallest diameter is 0.004 inches

GOLDEN SPECIALTY

FORM# RM002-002
REV 2015-01, EFF 3/19/15

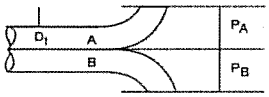
S-TYPE PITOT TUBE VISUAL INSPECTION

Pitot tube No: MU-5-1 **Date:** 10/27/16 **Performed By:** SN

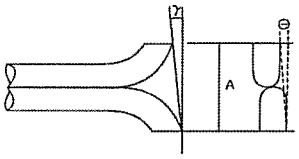
Pitot tube assembly level? ✓ Yes ____ No

Pitot tube openings damaged? ____ Yes (explain below) ✓ No

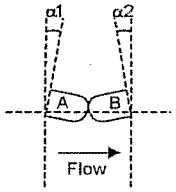
Pitot Diamater (circle) 1/4" 1/2" (3/8")



(Yes) No — The Pitot openings are level and uniform (circle one)

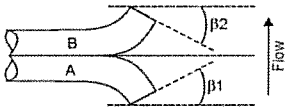


(Yes) No — The Pitot tips are on the same plane (circle one)



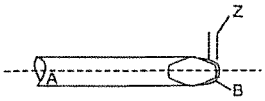
(Requirement <10°)

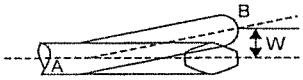
(Yes) No — I have inspected the Pitot and it meets the criteria (circle one)



(Requirement <5°)

(Yes) No — I have inspected the Pitot and it meets the criteria (circle one)





(Yes) No — Looking top down, the openings are NOT offset from each other (circle one)

Comments: ____

Calibration Required? ____ Yes X No

Pitot tube No. ____ *meets Method 2 specifications and is assigned a calibration factor of 0.84.*

Signature:

GOLDEN SPECIALTY

FORM# RM002-002
REV 2015-01, EFF 3/19/15

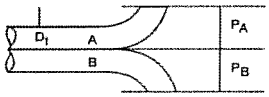
S-TYPE PITOT TUBE VISUAL INSPECTION

Pitot tube No: MM-5-2 **Date:** 10/27/16 **Performed By:** SN

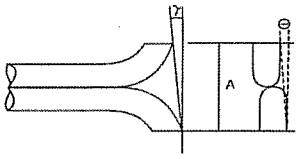
Pitot tube assembly level? ✓ Yes ____ No

Pitot tube openings damaged? ____ Yes (explain below) ✓ No

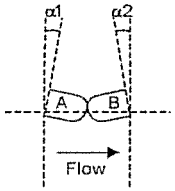
Pitot Diamater (circle) 1/4" 1/2" 3/8"



Yes
No
The Pitot openings are level and uniform (circle one)

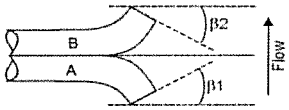


Yes
No
The Pitot tips are on the same plane (circle one)



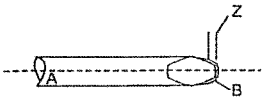
(Requirement <10°)

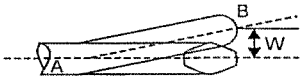
Yes
No
I have inspected the Pitot and it meets the criteria (circle one)



(Requirement <5°)

Yes
No
I have inspected the Pitot and it meets the criteria (circle one)





Yes
No
Looking top down, the openings are NOT offset from each other (circle one)

Comments: ____

Calibration Required? ____ Yes X No

Pitot tube No. *meets Method 2 specifications and is assigned a calibration factor of 0.84.*

Signature:

GOLDEN SPECIALTY

FORM# RM002-002
REV 2015-01, EFF 3/19/15

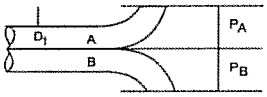
S-TYPE PITOT TUBE VISUAL INSPECTION

Pitot tube No: TIM-S-1 **Date:** 1-12/7/16 **Performed By:** SN

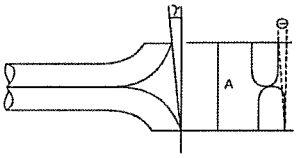
Pitot tube assembly level? ✓ Yes ____ No

Pitot tube openings damaged? ____ Yes (explain below) ✓ No

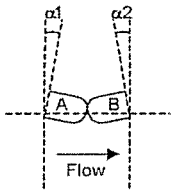
Pitot Diamater (circle) 1/4" 1/2" 3/8"



Yes
No
The Pitot openings are level and uniform (circle one)

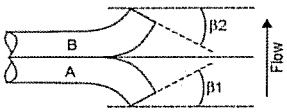


Yes
No
The Pitot tips are on the same plane (circle one)



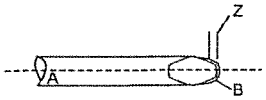
(Requirement <10°)

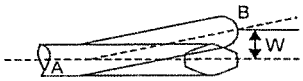
Yes
No
I have inspected the Pitot and it meets the criteria (circle one)



(Requirement <5°)

Yes
No
I have inspected the Pitot and it meets the criteria (circle one)





Yes
No
Looking top down, the openings are NOT offset from each other (circle one)

Comments: ____

Calibration Required? ____ Yes X No

Pitot tube No. ____ *meets Method 2 specifications and is assigned a calibration factor of 0.84.*

Signature:

APEX INSTRUMENTS
EPA Method 5
522 Series Meter Box Calibration
Pre-Test Orifice Method
English Meter Box Units, English K' Factor

Model #: RET-1
Serial #:

Date: ——————> 1/13/2016
Barometric Pressure: ———> 26.51 (in. Hg)
Theoretical Critical Vacuum:—> 12.50 (in. Hg)

!!!!!!!!
IMPORTANT For valid test results, the Actual Vacuum should be 1 to 2 in. Hg greater than the Theoretical Critical Vacuum shown above.
IMPORTANT The Critical Orifice Coefficient, K', must be entered in English units, (ft)^3*(deg R)^0.5/((in.Hg)*(min)).
!!!!!!!!

DRY GAS METER READINGS					CRITICAL ORIFICE READINGS									Average Temperatures	
ΔH (in H_2O)	Time (min)	Volume Initial (ft³)	Volume Final (ft³)	Volume Total (ft³)	Initial DGM Outlet Temps. (deg F)	Final DGM Outlet Temps. (deg F)	Orifice Serial #	K' Orifice Coefficient (see above)	Actual Vacuum (in Hg)	Ambient Temperature Initial (°F)	Ambient Temperature Final (°F)	Ambient Temperature Average (°F)	DGM Outlet Temp (°R)	Ambient Temp (°R)
0.25	20.00	0.013	6.185	6.172	45.0	51.0	SH - 40	0.2342	19.5	48.0	52.0	50.0	508.0	510.0
0.54	21.00	6.185	15.827	9.642	51.0	56.0	SH - 48	0.3482	18.5	52.0	56.0	54.0	513.5	514.0
0.91	20.00	031.723	043.765	12.042	62.0	63.0	SH - 55	0.4557	17.5	58.0	64.0	61.0	522.5	521.0
1.70	20.00	015.827	031.723	15.896	56.0	62.0	SH - 63	0.6064	15.5	56.0	58.0	57.0	519.0	517.0
2.70	11.00	043.765	055.222	11.457	63.0	66.0	SH - 73	0.7934	13.5	64.0	60.0	62.0	524.5	522.0

********** RESULTS **********

DRY GAS METER		ORIFICE		
VOLUME CORRECTED Vm(std) (dscf)	VOLUME CORRECTED Vm(std) (liters)	VOLUME CORRECTED Vcr(std) (dscf)	VOLUME CORRECTED Vcr(std) (liters)	VOLUME NOMINAL Vcr (dscf)
5.686	161.0	5.498	155.7	5.997
8.794	249.0	8.550	242.1	9.398
10.805	306.0	10.585	299.8	11.793
14.390	407.5	14.140	400.4	15.633
10.291	291.5	10.126	286.8	11.304

DRY GAS METER — CALIBRATION FACTOR Y		
Value (number)	Variation (number)	Pass / Fail
0.967	-0.010	Pass
0.972	-0.005	Pass
0.980	0.003	Pass
0.983	0.005	Pass
0.984	0.007	Pass
Average Y ——> 0.977		

ORIFICE — CALIBRATION FACTOR ΔH@			
Value (in H_2O)	Value (in H_2O)	Variation (in H_2O)	Pass / Fail
1.713	43.52	0.045	Pass
1.669	42.40	0.001	Pass
1.636	41.56	-0.032	Pass
1.724	43.80	0.056	Pass
1.598	40.60	-0.070	Pass
Average ΔH@ ——> 1.668	42.38		

Note: For Calibration Factor Y, the ratio of the reading of the calibration meter to the dry gas meter, acceptable tolerance of individual values from the average is +-0.02.

For Orifice Calibration Factor ΔH@, the orifice differential pressure in inches of H_2O that equates to 0.75 cfm of air at 68 F and 29.92 inches of Hg, acceptable tolerance of individual values from the average is +-0.2.

SIGNE Gunkler [illegible]

Date: 1/13/2016

EPA Method 5
Meter Box Calibration
Post-Test Orifice Method
English Meter Box Units, English K' Factor

Version: 2.3

Model #: RET-1
Serial #

Date: ----------> 11/1/2016
Barometric Pressure: --------> 25.64 (in. Hg)

Initial DGM Calibration Factor: 0.977

IMPORTANT: Select the Post-Test orifice serial number that closely approximates measured ΔH during the last test.

---------- DRY GAS METER READINGS ----------							-CRITICAL ORIFICE READINGS-							
										-- Ambient Temperature --			-- Average Temperature	
dH ($in\ H_2O$)	Time (min)	Volume Initial (ft^3)	Volume Final (ft^3)	Volume Total (ft^3)	Initial DGM Outlet Temps. (deg F)	Final DGM Outlet Temps. (deg F)	Orifice Serial# (number)	K' Orifice Coefficient (see above)	Actual Vacuum (in Hg)	Initial (deg F)	Final (deg F)	Average (deg F)	DGM Outlet (deg R)	Ambient Temp (deg R)
1.80	12.00	48.676	58.586	9.910	64.0	66.0	GT-63	0.5937	11.5	64.0	62.0	63.0	525.0	523.0
1.80	11.00	58.586	67.649	9.063	66.0	67.0	GT-63	0.5937	11.5	62.0	61.0	61.5	526.5	521.5
1.80	13.00	67.649	78.357	10.708	67.0	69.0	GT-63	0.5937	11.5	61.0	61.0	61.0	528.0	521.0

********** RESULTS **********

— DRY GAS METER —		-------- ORIFICE --------			-- DRY GAS METER --		-------- ORIFICE --------		
					CALIBRATION FACTOR Y		CALIBRATION FACTOR dH@		
VOLUME CORRECTED Vm(std) (ft^3)	VOLUME CORRECTED Vm(std) (liters)	VOLUME CORRECTED Vcr(std) (ft^3)	VOLUME CORRECTED Vcr(std) (liters)	VOLUME NOMINAL Vcr (ft^3)	Value (number)	Variation (number)	Value ($in\ H_2O$)	Value ($in\ H_2O$)	Variation ($in\ H_2O$)
8.582	243.0	7.988	226.2	9.236	0.931	-0.005	1.969	50.02	0.010
7.826	221.6	7.332	207.7	8.455	0.937	0.001	1.958	49.74	-0.001
9.220	261.1	8.670	245.5	9.987	0.940	0.004	1.951	49.55	-0.009
		Average Y ------>			0.936		1.960	49.77	<------ Average dH@

4.19% % Error

$$\%\,Error = \left(\frac{Y_{average} - Y_{orifice}}{Y_{orifice}}\right) \times 100$$

Note: DGM Calibration Factor must not deviate more than 5%.

SIGNED: _____

Date: 11/1/2016

APEX INSTRUMENTS
EPA Method 5
522 Series Meter Box Calibration
Pre-Test Orifice Method
English Meter Box Units, English K' Factor

Model #:
Serial #: CCI 1

Date: ——————> 1/19/2016
Barometric Pressure: ———> 26.58 (in. Hg)
Theoretical Critical Vacuum:---> 12.54 (in. Hg)

!!!!!!!!
IMPORTANT For valid test results, the Actual Vacuum should be 1 to 2 in. Hg greater than the Theoretical Critical Vacuum shown above.
IMPORTANT The Critical Orifice Coefficient, K', must be entered in English units. (ft)*3*(deg R)^0.5/((in.Hg)*(min)).
!!!!!!!!

DRY GAS METER READINGS					CRITICAL ORIFICE READINGS									
										– Ambient Temperature –			– Average Temperatures –	
ΔH (in H_2O)	Time (min)	Volume Initial (ft³)	Volume Final (ft³)	Volume Total (ft³)	Initial DGM Outlet Temps. (deg F)	Final DGM Outlet Temps. (deg F)	Orifice Serial #	K' Orifice Coefficient (see above)	Actual Vacuum (in Hg)	Initial (°F)	Final (°F)	Average (°F)	DGM Outlet Temp (°R)	Ambient Temp (°R)
0.22	20.00	247.086	253.086	6.000	56.0	61.0	SH - 40	0.2342	20.5	60.0	64.0	62.0	518.5	522.0
0.52	20.00	253.086	262.029	8.943	61.0	65.0	SH - 48	0.3482	18.5	64.0	66.0	65.0	523.0	525.0
0.90	20.00	262.029	273.760	11.731	65.0	67.0	SH - 55	0.4557	17.0	66.0	63.0	64.5	526.0	524.5
1.60	20.00	273.760	289.361	15.601	67.0	68.0	SH - 63	0.6064	15.0	63.0	66.0	64.5	527.5	524.5
2.70	10.00	299.506	309.560	10.054	68.0	69.0	SH - 73	0.7934	13.0	68.0	69.0	68.5	528.5	528.5

********** RESULTS **********

— DRY GAS METER —		— ORIFICE —			– DRY GAS METER – CALIBRATION FACTOR Y			— ORIFICE — CALIBRATION FACTOR ΔH@			
VOLUME CORRECTED Vm(std) (dscf)	VOLUME CORRECTED Vm(std) (liters)	VOLUME CORRECTED Vcr(std) (dscf)	VOLUME CORRECTED Vcr(std) (liters)	VOLUME NOMINAL Vcr (dscf)	Value (number)	Variation (number)	Pass / Fail	Value (in H_2O)	Value (in H_2O)	Variation (in H_2O)	Pass / Fail
5.429	153.7	5.449	154.3	6.067	1.004	-0.006	Pass	1.508	38.30	-0.081	Pass
8.029	227.4	8.079	228.8	9.046	1.006	-0.004	Pass	1.608	40.84	0.018	Pass
10.483	296.9	10.578	299.6	11.833	1.009	-0.001	Pass	1.614	40.99	0.024	Pass
13.928	394.5	14.076	398.6	15.746	1.011	0.001	Pass	1.616	41.04	0.026	Pass
8.986	254.5	9.173	259.8	10.340	1.021	0.011	Pass	1.602	40.69	0.012	Pass

Average Y ——> 1.010

Average ΔH@ ——> 1.589 40.37

Note: For Calibration Factor Y, the ratio of the reading of the calibration meter to the dry gas meter, acceptable tolerance of individual values from the average is +-0.02.

For Orifice Calibration Factor ΔH@, the orifice differential pressure in inches of H_2O that equates to 0.75 cfm of air at 68 F and 29.92 inches of Hg, acceptable tolerance of individual values from the average is +-0.2.

SIGNE C Gukba Kim

Date: 1/19/2016

EPA Method 5
Meter Box Calibration
Post-Test Orifice Method
English Meter Box Units, English K' Factor

Version: 2.3

Model #:
Serial # CCI-1

Date: ----------> 10/31/2016
Barometric Pressure: ---------> 25.61 (in. Hg)

Initial DGM Calibration Factor: 1.010

IMPORTANT: Select the Post-Test orifice serial number that closely approximates measured ΔH during the last test.

---------- DRY GAS METER READINGS ----------							-CRITICAL ORIFICE READINGS-							
										-- Ambient Temperature --			-- Average Temperature	
dH ($in\ H_2O$)	Time (min)	Volume Initial (ft^3)	Volume Final (ft^3)	Volume Total (ft^3)	Initial DGM Outlet Temps. (deg F)	Final DGM Outlet Temps. (deg F)	Orifice Serial# (number)	K' Orifice Coefficient (see above)	Actual Vacuum (in Hg)	Initial (deg F)	Final (deg F)	Average (deg F)	DGM Outlet (deg R)	Ambient Temp (deg R)
1.70	10.00	178.758	186.710	7.952	67.0	68.0	GT-63	0.5937	12.5	68.0	69.0	68.5	527.5	528.5
1.70	11.00	186.710	195.431	8.721	68.0	70.0	GT-63	0.5937	12.5	69.0	70.0	69.5	529.0	529.5
1.70	10.00	195.431	203.400	7.969	70.0	72.0	GT-63	0.5937	12.5	70.0	70.0	70.0	531.0	530.0

********** RESULTS **********

--- DRY GAS METER ---		-------- ORIFICE --------			-- DRY GAS METER --		------- ORIFICE -------		
					CALIBRATION FACTOR Y		CALIBRATION FACTOR dH@		
VOLUME CORRECTED Vm(std) (ft^3)	VOLUME CORRECTED Vm(std) (liters)	VOLUME CORRECTED Vcr(std) (ft^3)	VOLUME CORRECTED Vcr(std) (liters)	VOLUME NOMINAL Vcr (ft^3)	Value (number)	Variation (number)	Value ($in\ H_2O$)	Value ($in\ H_2O$)	Variation ($in\ H_2O$)
6.643	193.8	6.614	187.3	7.737	0.966	-0.003	1.873	47.57	0.003
7.484	211.9	7.268	205.8	8.519	0.971	0.002	1.871	47.53	0.001
6.813	192.9	6.604	187.0	7.748	0.969	0.000	1.866	47.39	-0.004
			Average Y ------>		0.969		1.870	47.50	<------ Average dH@

4.06% % Error

$$\% Error = \left(\frac{Y_{average} - Y_{orifice}}{Y_{orifice}} \right) \times 100$$

Note: DGM Calibration Factor must not deviate more than 5%.

SIGNED: _____ Date: 10/31/2016

DRY GAS METER CALIBRATION USING LOW FLOW CRITICAL ORIFICES

1) Select the orifice closest to the expected operating flow rate and insert in meterbox inlet.
2) For pretest calibration, leak check the system. Leak checking is not necessary for post-test calibrations.
3) Set vacuum as close as possible to the Orifice Calibration Report tested vacuum.
4) Observe the DGM dial, start timing as the needle passes the zero reference. Allow a minimum of 5 revolutions (pretest) or 3 revolutions (post-test) and stop timing again at the zero reference.
5) Record readings in outlined boxes below, other columns are automatically calculated.

DATE: 1/28/2016

METER PART #: VOST 1

METER SERIAL #: CCI VOST 1

CRITICAL ORIFICE SET SERIAL #: H-K4 17

	INITIAL	FINAL	AVG (P_{bar})
Bar. Pressure (mm Hg.)	665.734	665.734	665.734

Each Y must be ± 2.0% from the average (pretest) or ± 5.0% from the average (post-test).

ORIFICE NOMINAL FLOW (LPM)	RUN #	K' FACTOR (AVG)	TESTED VACUUM (mm Hg)	DGM READINGS (Liters) INITIAL	DGM READINGS (Liters) FINAL	DGM READINGS (Liters) NET (V_m)	TEMPERATURES °C AMBIENT	DGM INLET INITIAL	DGM INLET FINAL	DGM OUTLET INITIAL	DGM OUTLET FINAL	DGM AVG	ELAPSED TIME θ (Min.00)	DGM PRESSURE P_m (mm H_2O)	(1) V_m (STD)	(2) V_{cr} (STD)	(3) Y	Y VARIATION
0.645	1	0.01503	508	5,024.180	5,037.60	13.420	17.77778	20.556	22.778	21.667	23.333	22.08333	20.00	25.4	11.7076	11.7327	1.0021	-1.11
0.645	2	0.01503	508	5,037.60	5,050.890	13.290	17.22222	22.778	23.333	23.333	23.333	23.19444	20.00	25.4	11.5507	11.7439	1.0167	0.33
0.645	3	0.01503	508	5,050.890	5,064.170	13.280	17.22222	23.333	24.444	24.444	25	24.30556	20.00	25.4	11.4989	11.7439	1.0213	0.78
																AVG Y =	1.0134	
0.966	1	0.0222	469.9	4,959.27	4,978.30	19.03	18.88889	12.778	14.444	13.333	15	13.89	20.00	30.48	17.0852	17.2967	1.0124	0.51
0.966	2	0.0222	469.9	4,978.30	4,998.50	20.20	18.88889	14.444	17.222	15	19.444	16.53	21.00	30.48	17.9704	18.1615	1.0106	0.33
0.966	3	0.0222	469.9	4,998.50	5,018.18	19.68	18.88889	17.222	20.556	19.444	21.667	19.72	20.00	30.48	17.3169	17.2967	0.9988	-0.84
																AVG Y =	1.0073	
1.424	1	0.03945	419.1	5,064.170	5,093.10	28.930	18.88889	24.444	25	25	26.111	25.13889	21.00	35.56	25.0079	32.2735	1.2905	3.14
1.424	2	0.03945	419.1	5,093.10	5,121.890	28.790	18.88889	25	25	26.111	25.556	25.41667	20.00	35.56	24.8637	30.7367	1.2362	-1.20
1.424	3	0.03945	419.1	5,121.890	5,136.420	14.530	18.88889	25	26.667	25.556	26.667	25.97222	10.00	35.56	12.5251	15.3684	1.2270	-1.94
																AVG Y =	1.2512	

USING THE CRITICAL ORIFICES AS CALIBRATION STANDARDS:
The following equations are used to calculate the standard volumes of air passed through the DGM, V_m (std), and the critical orifice, V_{cr} (std), and the DGM calibration factor, Y. These equations are automatically calculated in the spreadsheet above.

Y=	1.0073
Previous Y	1.0550
% change	-4.74

(1) $V_m\,(std) = K_1\, V_m \dfrac{P_{bar} + (P_m/13.6)}{T_m}$ = Net volume of gas sample passed through DGM, corrected to standard conditions

K_1 = 17.64 °R/in. Hg (English), 0.3858 °K/mm Hg (Metric)

T_m = Absolute DGM avg. temperature (°R - English, °K - Metric)

(2) $V_{cr}\,(std) = K' \sqrt{\dfrac{P_{bar}\,\theta}{T_{amb}}}$ = Volume of gas sample passed through the critical orifice, corrected to standard conditions

T_{amb} = Absolute ambient temperature (°R - English, °K - Metric)

K' = Average K' factor from Critical Orifice Calibration

(3) $Y = \dfrac{V_{cr}\,(std)}{V_m\,(std)}$ = DGM calibration factor

Gukbo Kim

1/28/2016

DRY GAS METER CALIBRATION USING LOW FLOW CRITICAL ORIFICES

Quality - Service - Reliability

1) Select the orifice closest to the expected operating flow rate and insert in meterbox inlet.
2) For pretest calibration, leak check the system. Leak checking is not necessary for post-test calibrations.
3) Set vacuum as close as possible to the Orifice Calibration Report tested vacuum.
4) Observe the DGM dial, start timing as the needle passes the zero reference. Allow a minimum of 5 revolutions (pretest) or 3 revolutions (post-test) and stop timing again at the zero reference.
5) Record readings in outlined boxes below, other columns are automatically calculated.

DATE: 11/1/2016

METER PART #: VOST 1

METER SERIAL #: CCI VOST 1

CRITICAL ORIFICE SET SERIAL #: H-K4 11

	INITIAL	FINAL	AVG (P_{bar})
Bar. Pressure (mm Hg.)	651.256	651.256	651.256

Each Y must be ± 2.0% from the average (pretest) or ± 5.0% from the average (post-test).

ORIFICE NOMINAL FLOW (LPM)	RUN #	K' FACTOR (AVG)	TESTED VACUUM (mm Hg)	DGM READINGS (Liters) INITIAL	DGM READINGS (Liters) FINAL	DGM READINGS (Liters) NET (V_m)	TEMPERATURES °C AMBIENT	DGM INLET INITIAL	DGM INLET FINAL	DGM OUTLET INITIAL	DGM OUTLET FINAL	DGM AVG	ELAPSED TIME θ (Min.00)	DGM PRESSURE P_m (mm H_2O)	(1) V_m (STD)	(2) V_{cr} (STD)	(3) Y	Y VARIATION
	1					0.00						0			0.0	0.0	#DIV/0!	#DIV/0!
	2					0.00						0			0.0	0.0	#DIV/0!	#DIV/0!
	3					0.00						0			0.0	0.0	#DIV/0!	#DIV/0!
																AVG Y =	#DIV/0!	
0.660	1	0.0151	469.9	6,046.00	6,052.63	6.63	16.66667	16.667	18.333	17.222	18.889	17.78	10.00	25.4	5.7423	5.7765	1.0060	-0.96
0.660	2	0.0151	469.9	6,052.63	6,063.22	10.59	16.11111	18.333	20	18.889	20.556	19.44	16.00	25.4	9.1198	9.2513	1.0144	-0.13
0.660	3	0.0151	469.9	6,063.22	6,070.45	7.23	16.11111	20	21.111	20.556	22.222	20.97	11.00	25.4	6.1940	6.3603	1.0269	1.09
																AVG Y =	1.0157	
	1					.0						0			0.0	0.0	#DIV/0!	#DIV/0!
	2					.0						0			0.0	0.0	#DIV/0!	#DIV/0!
	3					.0						0			0.0	0.0	#DIV/0!	#DIV/0!
																AVG Y =	#DIV/0!	

USING THE CRITICAL ORIFICES AS CALIBRATION STANDARDS:
The following equations are used to calculate the standard volumes of air passed through the DGM, V_m (std), and the critical orifice, V_{cr} (std), and the DGM calibration factor, Y. These equations are automatically calculated in the spreadsheet above.

Y=	1.0157
Previous Y	1.0134
% change	0.23

(1) $V_m\,(std) = K_1\, V_m \dfrac{P_{bar} + (P_m/13.6)}{T_m}$ = Net volume of gas sample passed through DGM, corrected to standard conditions

K_1 = 17.64 °R/in. Hg (English), 0.3858 °K/mm Hg (Metric)

T_m = Absolute DGM avg. temperature (°R - English, °K - Metric)

(2) $V_{cr}\,(std) = K' \sqrt{\dfrac{P_{bar}\,\theta}{T_{amb}}}$ = Volume of gas sample passed through the critical orifice, corrected to standard conditions

T_{amb} = Absolute ambient temperature (°R - English, °K - Metric)

K' = Average K' factor from Critical Orifice Calibration

(3) $Y = \dfrac{V_{cr}\,(std)}{V_m\,(std)}$ = DGM calibration factor

11/01/16.

DRY GAS METER CALIBRATION USING LOW FLOW CRITICAL ORIFICES

1) Select the orifice closest to the expected operating flow rate and insert in meterbox inlet.
2) For pretest calibration, leak check the system. Leak checking is not necessary for post-test calibrations.
3) Set vacuum as close as possible to the Orifice Calibration Report tested vacuum.
4) Observe the DGM dial, start timing as the needle passes the zero reference. Allow a minimum of 5 revolutions (pretest) or 3 revolutions (post-test) and stop timing again at the zero reference.
5) Record readings in outlined boxes below, other columns are automatically calculated.

Quality - Service - R

DATE: 5/17/2016

METER PART #: VOST 2

METER SERIAL #: CCI VOST 2

CRITICAL ORIFICE SET SERIAL #: H-K4 17

	INITIAL	FINAL	AVG (P_{bar})
Bar. Pressure (mm Hg.)	656.336	657.098	656.717

Each Y must be ± 2.0% from the average (pretest) or ± 5.0% from the average (post-test).

ORIFICE NOMINAL FLOW (LPM)	RUN #	K' FACTOR (AVG)	TESTED VACUUM (mm Hg)	DGM READINGS (Liters) INITIAL	DGM READINGS (Liters) FINAL	DGM READINGS (Liters) NET (V_m)	TEMPERATURES °C AMBIENT	DGM INLET INITIAL	DGM INLET FINAL	DGM OUTLET INITIAL	DGM OUTLET FINAL	DGM AVG	ELAPSED TIME θ (Min.00)	DGM PRESSURE P_m (mm H_2O)	(1) V_m (STD)	(2) V_{cr} (STD)	(3) Y	Y VARIATION
1.424	1	0.03278	393.7	1,542.080	1,563.250	21.170	20	19.444	20	19.444	20	19.72222	15.00	48.26	18.4130	18.8596	1.0243	0.81
1.424	2	0.03278	393.7	1,563.250	1,584.90	21.650	20	20	22.222	20	22.222	21.11111	15.00	48.26	18.7416	18.8596	1.0063	-0.96
1.424	3	0.03278	393.7	1,584.90	1,606.450	21.550	20	22.222	23.889	22.222	23.889	23.05556	15.00	48.26	18.5325	18.8596	1.0177	0.16
																AVG Y =	1.0161	
0.966	1	0.0222	444.5	1,606.45	1,621.97	15.52	20	24.444	25.556	24.444	25.556	25.00	15.00	30.48	13.2336	12.7725	0.9652	-0.41
0.966	2	0.0222	457.2	1,621.97	1,637.50	15.53	20	25.556	26.667	25.556	26.667	26.11	15.00	30.48	13.1929	12.7725	0.9681	-0.11
0.966	3	0.0222	457.2	1,637.50	1,652.99	15.49	20	26.667	27.778	26.667	27.778	27.22	15.00	30.48	13.1103	12.7725	0.9742	0.52
																AVG Y =	0.9692	
0.654	1	0.01503	469.9	1,652.990	1,663.455	10.465	20	13.333	15	14.444	16.667	14.86111	15.00	27.94	9.2348	8.6474	0.9364	1.93
0.654	2	0.01503	469.9	1,663.455	1,674.253	10.798	20	15	17.222	16.667	17.778	16.66667	15.00	27.94	9.4693	8.6474	0.9132	-0.59
0.654	3	0.01503	469.9	1,674.523	1,685.830	11.307	20	27.778	28.333	27.778	28.333	28.05556	15.00	27.94	9.5407	8.6474	0.9064	-1.34
																AVG Y =	0.9187	

5/17/16

Y=	0.9692
Previous Y	1.0550
% change	-8.85

(1) $V_m\,(std) = K_1\, V_m \dfrac{P_{bar} + (P_m/13.6)}{T_m}$ = Net volume of gas sample passed through DGM, corrected to standard conditions

K_1 = 17.64 °R/in. Hg (English), 0.3858 °K/mm Hg (Metric)

T_m = Absolute DGM avg. temperature (°R - English, °K - Metric)

(2) $V_{cr}\,(std) = K' \dfrac{P_{bar}\,\theta}{T_{amb}}$ = Volume of gas sample passed through the critical orifice, corrected to standard conditions

T_{amb} = Absolute ambient temperature (°R - English, °K - Metric)

K' = Average K' factor from Critical Orifice Calibration

(3) $Y = \dfrac{V_{cr}\,(std)}{V_m\,(std)}$ = DGM calibration factor

DRY GAS METER CALIBRATION USING LOW FLOW CRITICAL ORIFICES

1) Select the orifice closest to the expected operating flow rate and insert in meterbox inlet.
2) For pretest calibration, leak check the system. Leak checking is not necessary for post-test calibrations.
3) Set vacuum as close as possible to the Orifice Calibration Report tested vacuum.
4) Observe the DGM dial, start timing as the needle passes the zero reference. Allow a minimum of 5 revolutions (pretest) or 3 revolutions (post-test) and stop timing again at the zero reference.
5) Record readings in outlined boxes below, other columns are automatically calculated.

DATE: 11/1/2016 | METER SERIAL #: CCI VOST 2

METER PART #: VOST 2 | CRITICAL ORIFICE SET SERIAL #: H-K4 11

	INITIAL	FINAL	AVG (P_{bar})
Bar. Pressure (mm Hg.)	651.256	651.256	651.256

Each Y must be ± 2.0% from the average (pretest) or ± 5.0% from the average (post-test).

ORIFICE NOMINAL FLOW (LPM)	RUN #	K' FACTOR (AVG)	TESTED VACUUM (mm Hg)	DGM READINGS (Liters) INITIAL	DGM READINGS (Liters) FINAL	NET (V_m)	TEMPERATURES °C AMBIENT	DGM INLET INITIAL	DGM INLET FINAL	DGM OUTLET INITIAL	DGM OUTLET FINAL	DGM AVG	ELAPSED TIME θ (Min.00)	DGM PRESSURE P_m (mm H_2O)	(1) V_m (STD)	(2) V_{cr} (STD)	(3) Y	Y VARIATION
	1					0.00						0			0.0	0.0	#DIV/0!	#DIV/0!
	2					0.00						0			0.0	0.0	#DIV/0!	#DIV/0!
	3					0.00						0			0.0	0.0	#DIV/0!	#DIV/0!
																AVG Y =	#DIV/0!	
0.660	1	0.0151	469.9	2,391.50	2,400.32	8.82	16.11111	17.222	18.333	17.222	19.444	18.06	12.00	27.94	7.6340	6.9385	0.9089	0.68
0.660	2	0.0151	469.9	2,400.32	2,407.77	7.45	16.11111	18.333	19.444	19.444	20.556	19.44	10.00	27.94	6.4176	5.7821	0.9010	-0.19
0.660	3	0.0151	469.9	2,407.77	2,425.84	18.07	16.11111	19.444	22.778	20.556	23.889	21.67	24.00	27.94	15.4486	13.8770	0.8983	-0.49
																AVG Y =	0.9027	
	1					.0						0			0.0	0.0	#DIV/0!	#DIV/0!
	2					.0						0			0.0	0.0	#DIV/0!	#DIV/0!
	3					.0						0			0.0	0.0	#DIV/0!	#DIV/0!
																AVG Y =	#DIV/0!	

USING THE CRITICAL ORIFICES AS CALIBRATION STANDARDS:
The following equations are used to calculate the standard volumes of air passed through the DGM, V_m (std), and the critical orifice, V_{cr} (std), and the DGM calibration factor, Y. These equations are automatically calculated in the spreadsheet above.

Y=	0.9027
Previous Y	0.9187
% change	-1.77

11/01/16

(1) $V_m\,(std) = K_1\, V_m \dfrac{P_{bar} + (P_m/13.6)}{T_m}$ = Net volume of gas sample passed through DGM, corrected to standard conditions

K_1 = 17.64 °R/in. Hg (English), 0.3858 °K/mm Hg (Metric)

T_m = Absolute DGM avg. temperature (°R - English, °K - Metric)

(2) $V_{cr}\,(std) = K' \sqrt{\dfrac{P_{bar}\,\theta}{T_{amb}}}$ = Volume of gas sample passed through the critical orifice, corrected to standard conditions

T_{amb} = Absolute ambient temperature (°R - English, °K - Metric)

K' = Average K' factor from Critical Orifice Calibration

(3) $Y = \dfrac{V_{cr}\,(std)}{V_m\,(std)}$ = DGM calibration factor

DRY GAS METER CALIBRATION USING LOW FLOW CRITICAL ORIFICES

1) Select the orifice closest to the expected operating flow rate and insert in meterbox inlet.
2) For pretest calibration, leak check the system. Leak checking is not necessary for post-test calibrations.
3) Set vacuum as close as possible to the Orifice Calibration Report tested vacuum.
4) Observe the DGM dial, start timing as the needle passes the zero reference. Allow a minimum of 5 revolutions (pretest) or 3 revolutions (post-test) and stop timing again at the zero reference.
5) Record readings in outlined boxes below, other columns are automatically calculated.

					INITIAL	FINAL	AVG (P_{bar})
DATE:	1/29/2016	METER SERIAL #:	CCI VOST 3	Bar. Pressure (mm Hg.)	665.734	665.734	665.734
METER PART #:	VOST 3	CRITICAL ORIFICE SET SERIAL #:	H-K4 17				

Each Y must be ± 2.0% from the average (pretest) or ± 5.0% from the average (post-test).

ORIFICE NOMINAL FLOW (LPM)	RUN #	K' FACTOR (AVG)	TESTED VACUUM (mm Hg)	DGM READINGS (Liters) INITIAL	DGM READINGS (Liters) FINAL	DGM READINGS (Liters) NET (V_m)	TEMPERATURES °C AMBIENT	DGM INLET INITIAL	DGM INLET FINAL	DGM OUTLET INITIAL	DGM OUTLET FINAL	DGM AVG	ELAPSED TIME θ (Min.00)	DGM PRESSURE P_m (mm H_2O)	(1) V_m (STD)	(2) V_{cr} (STD)	(3) Y	Y VARIATION
0.645	1	0.01503	431.8	.0	13.421	13.421	16.66667	8.3333	10	8.3333	10	9.166667	20.00	25.4	12.2441	11.7551	0.9601	-0.60
0.645	2	0.01503	431.8	.0	13.384	13.384	16.66667	10	11.667	10	11.667	10.83333	20.00	25.4	12.1387	11.7551	0.9684	0.27
0.645	3	0.01503	431.8	.0	14.828	14.828	16.11111	11.667	13.889	11.667	13.889	12.77778	22.00	25.4	13.3569	12.9431	0.9690	0.33
																AVG Y =	0.9658	
0.966	1	0.0222	406.4	0.00	20.07	20.07	17.77778	13.889	15.556	13.889	15.556	14.72	20.00	25.4	17.9585	17.3297	0.9650	-0.28
0.966	2	0.0222	406.4	0.00	20.11	20.11	16.11111	15.556	16.111	15.556	16.111	15.83	20.00	25.4	17.9233	17.3796	0.9697	0.21
0.966	3	0.0222	406.4	0.00	20.19	20.19	15.55556	16.111	16.111	16.667	16.111	16.25	20.00	25.4	17.9652	17.3963	0.9683	0.07
																AVG Y =	0.9677	
1.424	1	0.03945	381	.0	26.155	26.155	16.11111	16.667	17.222	16.667	17.222	16.94444	18.00	25.4	23.2217	27.7955	1.1970	0.04
1.424	2	0.03945	381	.0	14.579	14.579	15	17.222	17.778	17.222	17.778	17.5	10.00	25.4	12.9192	15.4717	1.1976	0.09
1.424	3	0.03945	381	.0	32.178	32.178	15	17.778	17.778	17.778	17.778	17.77778	22.00	25.4	28.4874	34.0378	1.1948	-0.14
																AVG Y =	1.1965	

USING THE CRITICAL ORIFICES AS CALIBRATION STANDARDS:
The following equations are used to calculate the standard volumes of air passed through the DGM, V_m (std), and the critical orifice, V_{cr} (std), and the DGM calibration factor, Y. These equations are automatically calculated in the spreadsheet above.

Y=	0.9677
Previous Y	1.0
% change	-3.34

(1) $V_m\,(std) = K_1\, V_m \dfrac{P_{bar} + (P_m/13.6)}{T_m}$ = Net volume of gas sample passed through DGM, corrected to standard conditions

K_1 = 17.64 °R/in. Hg (English), 0.3858 °K/mm Hg (Metric)

T_m = Absolute DGM avg. temperature (°R - English, °K - Metric)

(2) $V_{cr}\,(std) = K' \sqrt{\dfrac{P_{bar}\,\theta}{T_{amb}}}$ = Volume of gas sample passed through the critical orifice, corrected to standard conditions

T_{amb} = Absolute ambient temperature (°R - English, °K - Metric)

K' = Average K' factor from Critical Orifice Calibration

(3) $Y = \dfrac{V_{cr}\,(std)}{V_m\,(std)}$ = DGM calibration factor

Gukbo Kim 1/29/2016

DRY GAS METER CALIBRATION USING LOW FLOW CRITICAL ORIFICES

1) Select the orifice closest to the expected operating flow rate and insert in meterbox inlet.
2) For pretest calibration, leak check the system. Leak checking is not necessary for post-test calibrations.
3) Set vacuum as close as possible to the Orifice Calibration Report tested vacuum.
4) Observe the DGM dial, start timing as the needle passes the zero reference. Allow a minimum of 5 revolutions (pretest) or 3 revolutions (post-test) and stop timing again at the zero reference.
5) Record readings in outlined boxes below, other columns are automatically calculated.

DATE: 11/1/2016

METER PART #: VOST 3

METER SERIAL #: CCI VOST 3

CRITICAL ORIFICE SET SERIAL #: H-K4 17

	INITIAL	FINAL	AVG (P_{bar})
Bar. Pressure (mm Hg.)	651.256	651.256	651.256

Each Y must be ± 2.0% from the average (pretest) or ± 5.0% from the average (post-test).

ORIFICE NOMINAL FLOW (LPM)	RUN #	K' FACTOR (AVG)	TESTED VACUUM (mm Hg)	DGM READINGS (Liters) INITIAL	DGM READINGS (Liters) FINAL	DGM READINGS (Liters) NET (V_m)	TEMPERATURES °C AMBIENT	DGM INLET INITIAL	DGM INLET FINAL	DGM OUTLET INITIAL	DGM OUTLET FINAL	DGM AVG	ELAPSED TIME θ (Min.00)	DGM PRESSURE P_m (mm H_2O)	(1) V_m (STD)	(2) V_{cr} (STD)	(3) Y	Y VARIATION
	1					0.00						0			0.0	0.0	#DIV/0!	#DIV/0!
	2					0.00						0			0.0	0.0	#DIV/0!	#DIV/0!
	3					0.00						0			0.0	0.0	#DIV/0!	#DIV/0!
																AVG Y =	#DIV/0!	
0.660	1	0.0151	431.8	0.00	8.08	8.08	18.33333	16.111	16.667	16.111	16.667	16.39	12.00	25.4	7.0343	6.9120	0.9826	-0.29
0.660	2	0.0151	431.8	0.00	7.42	7.42	16.11111	16.667	17.222	16.667	17.222	16.94	11.00	25.4	6.4467	6.3603	0.9866	0.12
0.660	3	0.0151	431.8	0.00	8.78	8.78	16.11111	17.222	17.222	17.222	17.222	17.22	13.00	25.4	7.6146	7.5167	0.9871	0.17
																AVG Y =	0.9854	
	1					.0						0			0.0	0.0	#DIV/0!	#DIV/0!
	2					.0						0			0.0	0.0	#DIV/0!	#DIV/0!
	3					.0						0			0.0	0.0	#DIV/0!	#DIV/0!
																AVG Y =	#DIV/0!	

USING THE CRITICAL ORIFICES AS CALIBRATION STANDARDS:
The following equations are used to calculate the standard volumes of air passed through the DGM, V_m (std), and the critical orifice, V_{cr} (std), and the DGM calibration factor, Y. These equations are automatically calculated in the spreadsheet above.

Y=	0.9854
Previous Y	0.9658
% change	1.99

(1) $V_m\,(std) = K_1\, V_m \dfrac{P_{bar} + (P_m/13.6)}{T_m}$ = Net volume of gas sample passed through DGM, corrected to standard conditions

K_1 = 17.64 °R/in. Hg (English), 0.3858 °K/mm Hg (Metric)

T_m = Absolute DGM avg. temperature (°R - English, °K - Metric)

(2) $V_{cr}\,(std) = K' \sqrt{\dfrac{P_{bar}\,\theta}{T_{amb}}}$ = Volume of gas sample passed through the critical orifice, corrected to standard conditions

T_{amb} = Absolute ambient temperature (°R - English, °K - Metric)

K' = Average K' factor from Critical Orifice Calibration

(3) $Y = \dfrac{V_{cr}\,(std)}{V_m\,(std)}$ = DGM calibration factor

11/01/16

AeroMet
Engineering, Inc.
Solutions for a Changing Environment

Certification of Visible Opacity Reading

Jacob Amerman

qualified to conduct EPA Method 9 Tests for visible opacity in accordance with the methods established for such qualification in 40 CFR Part 60 Appendix A.

Certification Date: September 29, 2016

Expiration Date: March 29, 2017

AeroMet Instructor: Josh Haslag

USEPA METHOD 5
MANUAL ISOKINETICS CALCULATION FORM

Source: Press Vent #1 (East Vent) Run: 3
Test Date: 10/26/2016 Personnel: SN/AK/JA/JH

Values from Field Data Sheet

Avg. $\sqrt{\Delta P}$	0.399	T_s	544.5	°R	P_{bar}	29.38		P_s	0.10	C_p	0.84		
Avg. ΔH	1.80	T_m	516.7	°R	V_m	93.444		A_s	11.54	M_f	0.0082	(FPM)	
Meter Y	0.977	O_2	20.95	%	CO_2	0.08	%	V_{lc}	35.1	M_n	0.0094	(Total)	
Meter ΔH@	1.668				D_n	0.3292		MSF	2.19	θ	120	min.	

Calculated Values

1. Nozzle Area = $A_n = (3.1416 / (144*4))*(D_n)^2$

2. Stack Standard Pressure = $P_s = P_{bar} + (P_{static}/13.6)$

3. Standard Sample Volume = $V_{m(std)} = \dfrac{(V_m)(Y)(528)(P_{bar} + \Delta H/13.6))}{(T_m)(29.92)}$

4. Water Vapor Collected = $V_w = (0.0415)(V_{lc})$

5. Moisture Content = Bws = $\dfrac{V_w}{(V_w + V_{m(std)})}$

6. Stack Gas Dry Molecular Weight = M_d *If "NA" for O_2 & CO_2, 29.0 from Section 8.6 of Method 2 was used.*

$M_d = 0.44(CO_2\%) + 0.32(O_2\%) + 0.28(100-(CO_2\%+O_2\%))$

7. Stack Gas Molecular Weight = $M_s = M_d(1-B_{ws}) + 18(B_{ws})$

8. Stack Gas Velocity = $V_s = 85.49\ (C_p)\ (\text{Avg. } \sqrt{\Delta P})\ (\sqrt{(T_s/(M_s P_s))})$

9. Stack Gas Velocity = ACFM = $V_s \times 60 \times A_s$

10. Isokineticity = $I = \dfrac{100\ (T_s)[(0.002669)\ (V_{lc}) + T_m \dfrac{(V_m Y)}{(P_{bar} + 13.6)} \dfrac{\Delta H}{}}{(60)(\theta)(V_s)(P_s)(A_n)}$

a

USEPA METHOD 5
MANUAL ISOKINETICS CALCULATION FORM

Values from Field Data, Particulate Data Sheets

Stack Area = A_s = 11.54

FPM Collected, grams = m_f = 0.0082

Total PM Collected, grams = m_n = 0.0094

11. Stack Gas Dry Volumetric Flow, dscfm = Q_{std} = (1.00 - B_{ws}) (ACFM) (528/T_s) (P_s/29.92)

12. FPM Loading, gr/dscf = C_s = 15.43 gr/g)(M_n/$V_{m(std)}$)

13. FPM Emission Rate, lb/hr = E = (60)(Q_{std})(C_s) / (7000)

14. FPM Emission Rate, lb/MSF = lb/hr / MSF/hr

15. FPM Emission Rate, tons/yr = lb/MSF FPM / 2,000 x MSF/yr

16. Total PM Loading, gr/dscf = C_t = 15.43 gr/g)(M_n/$V_{m(std)}$)

17. Total PM Emission Rate, lb/hr = E = (60)(Q_{std})(C_t) / (7000)

18. Total PM Emission Rate, lb/MSF = lb/hr / MSF/hr

19. Total PM Emission Rate, tons/yr = lb/MSF Total PM / 2,000 x MSF/yr

a

USEPA METHOD 5
MANUAL ISOKINETICS CALCULATION FORM

Source: Press Vent #1 (East Vent) Run #: 3
Test Date: 10/26/16 Completed By: SN/AK/JA/JH

Values from Field Data Sheet

Avg. $\sqrt{\Delta P}$	0.399	T_s	544.5	°R	P_{bar}	29.38	P_s	0.1	C_p	0.84	
Avg. ΔH	1.80	T_m	516.7	°R	V_m	93.444	A_s	11.54	M_n	0.0082	(FPM)
Meter Y	0.977	O_2	20.95		CO_2	0.08	V_{lc}	35.1	M_n	0.0094	(Total)
Meter ΔH@	1.668				D_n	0.3292	MSF	2.19	θ	120	min.

Calculated Values

1. A_n = (3.1416 / (144*4)* (0.3292)^2 — 5.911E-04

2. P_s = (29.38) + (0.1 / 13.6) = — 29.39

3. $V_{m(std)}$ = (93.444)(0.977)(528)(29.38 + 1.80 /13.6) / (516.7)(29.92) = — 92.022

4. V_w = (0.04715)(35.1) = — 1.65

5. B_{ws} = (1.65)/ (1.65 + 92.022) = — 0.0177

6. M_d = 0.44(0.08)+ 0.32(20.95)+ 0.28(100- (0.08 + 20.95)) = — 28.85

7. M_s = (28.85)(1- 0.0177) + 18 (0.0177) = — 28.66

8. V_s = 85.49(0.84)(0.399)(√(544.5 / 28.66 * 29.39)) = — 23.05

9. ACFM = (23.05)(60)(11.54) — 15,964

10. Isokineticity = I = 100 (544.5)[(0.002669)(35.1) + (93.444)(0.977) / 516.7 (29.38 + 1.80 / 13.6)] / (60)(120)(23.05)(29.39)(5.911E-04) — 100.2

Emission Concentration and Rate Calculations

11. Stack Gas Dry Volumetric Flow, dscfm = Q_{std} = (1 - 0.0177)(15,964) (528 / 544.5)(29.39 / 29.92) — 14,937

12. FPM Loading = C_s = 15.43 (0.0082 / 92.02) = — 0.0014

13. FPM Emissions, lb/hr = E_f = 60 (14,937)(0.0014) / 7000 = — 0.18

14. FPM Emissions, lb/MSF = 0.18 / 2.19 = — 0.080

15. FPM Emissions, tons/yr = 0.080 / 2,000 * 19,454.5 = — 0.78

16. Total PM Loading = C_t = 15.43 (0.0094 / 92.02) = — 0.0016

17. Total PM Emissions, lb/hr = E_t = 60 (14,937)(0.0016) / 7000 = — 0.20

18. Total PM Emissions, lb/MSF = 0.20 / 2.19 = — 0.092

19. Total PM Emissions, tons/yr = 0.092 / 2,000 * 19,454.5 = — 0.89

USEPA METHOD 5
MANUAL ISOKINETICS CALCULATION FORM

Source: Press Vent #1 (West Vent) Run: 1

Test Date: 10/25/2016 Personnel: SN/AK/JA/JH

Values from Field Data Sheet

Avg. $\sqrt{\Delta P}$	0.485	T_s	546.3	°R	P_{bar}	29.04		P_s	0.10	C_p	0.84			
Avg. ΔH	2.40	T_m	531.4	°R	V_m	106.314		A_s	11.54	M_f	0.0598	(FPM)		
Meter Y	1.010	O_2	20.98	%	CO_2	0.05	%	V_{lc}	38.0	M_n	0.0631	(Total)		
Meter ΔH@	1.589				D_n	0.3235		MSF	2.07	θ	120	min.		

Calculated Values

1. Nozzle Area = $A_n = (3.1416 / (144*4))*(D_n)^2$

2. Stack Standard Pressure = $P_s = P_{bar} + (P_{static}/13.6)$

3. Standard Sample Volume = $V_{m(std)} = \dfrac{(V_m)(Y)(528)(P_{bar} + \Delta H/13.6))}{(T_m)(29.92)}$

4. Water Vapor Collected = $V_w = (0.0415)(V_{lc})$

5. Moisture Content = Bws = $\dfrac{V_w}{(V_w + V_{m(std)})}$

6. Stack Gas Dry Molecular Weight = M_d *If "NA" for O_2 & CO_2, 29.0 from Section 8.6 of Method 2 was used.*

$M_d = 0.44(CO_2\%) + 0.32(O_2\%) + 0.28(100-(CO_2\%+O_2\%))$

7. Stack Gas Molecular Weight = $M_s = M_d(1-B_{ws}) + 18(B_{ws})$

8. Stack Gas Velocity = $V_s = 85.49\ (C_p)\ (\text{Avg. } \sqrt{\Delta P})\ (\sqrt{(T_s/(M_s P_s))})$

9. Stack Gas Velocity = ACFM = $V_s \times 60 \times A_s$

10. Isokineticity = $I = \dfrac{100\ (T_s)[(0.002669)\ (V_{lc}) + T_m \dfrac{(V_m Y)}{(P_{bar} + 13.6)} \dfrac{\Delta H}{}}{(60)(\theta)(V_s)(P_s)(A_n)}$

a

USEPA METHOD 5
MANUAL ISOKINETICS CALCULATION FORM

Values from Field Data, Particulate Data Sheets

Stack Area = A_s = 11.54

FPM Collected, grams = m_f = 0.0598

Total PM Collected, grams = m_n = 0.0631

11. Stack Gas Dry Volumetric Flow, dscfm = Q_{std} = (1.00 - B_{ws}) (ACFM) (528/T_s) (P_s/29.92)

12. FPM Loading, gr/dscf = C_s = 15.43 gr/g)(M_n/$V_{m(std)}$)

13. FPM Emission Rate, lb/hr = E = (60)(Q_{std})(C_s) / (7000)

14. FPM Emission Rate, lb/MSF = lb/hr / MSF/hr

15. FPM Emission Rate, tons/yr = lb/MSF FPM / 2,000 x MSF/yr

16. Total PM Loading, gr/dscf = C_t = 15.43 gr/g)(M_n/$V_{m(std)}$)

17. Total PM Emission Rate, lb/hr = E = (60)(Q_{std})(C_t) / (7000)

18. Total PM Emission Rate, lb/MSF = lb/hr / MSF/hr

19. Total PM Emission Rate, tons/yr = lb/MSF Total PM / 2,000 x MSF/yr

USEPA METHOD 5
MANUAL ISOKINETICS CALCULATION FORM

Source: Press Vent #1 (West Vent) Run #: 1
Test Date: 10/25/16 Completed By: SN/AK/JA/JH

Values from Field Data Sheet

Avg. $\sqrt{\Delta P}$	0.485	T_s	546.3	°R	P_{bar}	29.04	P_s	0.1	C_p	0.84	
Avg. ΔH	2.40	T_m	531.4	°R	V_m	106.314	A_s	11.54	M_n	0.0598	(FPM)
Meter Y	1.010	O_2	20.98		CO_2	0.05	V_{lc}	38.0	M_n	0.0631	(Total)
Meter ΔH@	1.589				D_n	0.3235	MSF	2.07	θ	120	min.

Calculated Values

1. A_n = (3.1416 / (144*4)* (0.3235)^2 — 5.708E-04

2. P_s = (29.04) + (0.1 / 13.6) = — 29.05

3. $V_{m(std)}$ = $\frac{(106.314)(1.010)(528)(29.04 + 2.40/13.6)}{(531.4)(29.92)}$ = — 104.174

4. V_w = (0.04715)(38.0) = — 1.79

5. B_{ws} = (1.79)/ (1.79 + 104.174) = — 0.0169

6. M_d = 0.44(0.05)+ 0.32(20.98)+ 0.28(100- (0.05 + 20.98)) = — 28.85

7. M_s = (28.85)(1- 0.0169) + 18 (0.0169) = — 28.66

8. V_s = 85.49(0.84)(0.485)(√(546.3 / 28.66 * 29.05)) = — 28.19

9. ACFM = (28.19)(60)(11.54) — 19,524

10. Isokineticity = I = $\frac{100(546.3)[(0.002669)(38.0) + \frac{(106.314)(1.010)}{531.4}(29.04 + \frac{2.40}{13.6})}{(60)(120)(28.19)(29.05)(5.708E-04)}$ — 97.5

Emission Concentration and Rate Calculations

11. Stack Gas Dry Volumetric Flow, dscfm = Q_{std} = — 18,011
(1 - 0.0169)(19,524) (528 / 546.3)(29.05 / 29.92)

12. FPM Loading = C_s = 15.43 (0.0598 / 104.17) = — 0.0089

13. FPM Emissions, lb/hr = E_f = 60 (18,011)(0.0089) / 7000 = — 1.37

14. FPM Emissions, lb/MSF = 1.37 / 2.07 = — 0.661

15. FPM Emissions, tons/yr = 0.661 / 2,000 * 19,454.5 = — 6.43

16. Total PM Loading = C_t = 15.43 (0.0631 / 104.17) = — 0.0093

17. Total PM Emissions, lb/hr = E_t = 60 (18,011)(0.0093) / 7000 = — 1.44

18. Total PM Emissions, lb/MSF = 1.44 / 2.07 = — 0.698

19. Total PM Emissions, tons/yr = 0.698 / 2,000 * 19,454.5 = — 6.79

USEPA METHODS 1-4
MANUAL CALCULATION FORM

Source: Press Vent #1 (East Vent) Run: *2

Test Date: 10/26/2016 Personnel: SN/AK/JA/JH

Values from Field Data Sheet

Avg. $\sqrt{\Delta P}$	0.406	T_s	546.8	°R	P_{bar}	29.38		P_s	0.10	C_p	0.84		
Avg. ΔH	1.50	T_m	522.8	°R	V_m	42.271		A_s	11.54	M_n	NA	total	
Meter Y	0.977	O_2	20.94	%	CO_2	0.04	%	V_{lc}	13.6	θ	60	min.	
Meter ΔH@	1.668				D_n	NA							

Calculated Values

1. Stack Standard Pressure = $P_s = P_{bar} + (P_{static}/13.6)$

2. Standard Sample Volume = $V_{m(std)} = \dfrac{(V_m)(Y)(528)(P_{bar} + \Delta H/13.6))}{(T_m)(29.92)}$

3. Water Vapor Collected = $V_w = (0.0415)(V_{lc})$

4. Moisture Content = Bws = $\dfrac{V_w}{(V_w + V_{m(std)})}$

5. Stack Gas Dry Molecular Weight = M_d *If "NA" for O_2 & CO_2, 29.0 from Section 8.6 of Method 2 was used.*

   $M_d = 0.44(CO_2\%) + 0.32(O_2\%) + 0.28(100-(CO_2\%+O_2\%))$

6. Stack Gas Molecular Weight = $M_s = M_d(1-B_{ws}) + 18(B_{ws})$

7. Stack Gas Velocity = $V_s = 85.49\ (C_p)\ (\text{Avg. } \sqrt{\Delta P})\ (\sqrt{(T_s/(M_s P_s))})$

8. Stack Gas Velocity = ACFM = V_s X 60 X A_s

9. Stack Gas Dry Volumetric Flow, dscfm = $Q_{std} = (1.00 - B_{ws})\ (ACFM)\ (528/T_s)\ (P_s/29.92)$

10. Conversion = dscf to dscm = $V_{m(std)} = V_{m(std)} / 35.31$

USEPA METHODS 1-4
MANUAL CALCULATION FORM

Source: Press Vent #1 (East Vent) Run #: *2
Test Date: 10/26/16 Completed By: SN/AK/JA/JH

Values from Field Data Sheet

Avg. $\sqrt{\Delta P}$	0.406	T_s	546.8	°R	P_{bar}	29.38		P_s	0.1	C_p	0.84
Avg. ΔH	1.500	T_m	522.8	°R	V_m	42.271		A_s	11.54	M_n	NA
Meter Y	0.977	O_2	20.94		CO_2	0.04		V_{lc}	13.6	θ	60 min.
Meter ΔH@	1.668				D_n	NA					

Calculated Values

1. P_s = (29.38) + (0.1 / 13.6) = 29.39

2. $V_{m(std)}$ = (42.271)(0.977)(528)(29.38 + 1.50 /13.6) / (522.8)(29.92) = 41.114

3. V_w = (0.04715)(13.6) = 0.64

4. B_{ws} = (0.64)/ (0.64 + 41.114) = 0.0154

5. M_d = 0.44(0.04)+ 0.32(20.94)+ 0.28(100- (0.04 + 20.94)) = 28.84

6. M_s = (28.84)(1- 0.0154) + 18 (0.0154) = 28.68

7. v_s = 85.49(###)(0.406)(√(546.8 / 28.68 * 29.39)) = 23.48

8. ACFM = (23.48)(60)(11.54) 16,257

9. Stack Gas Dry Volumetric Flow, dscfm = Q_{std} = 15,183
(1 - 0.0154)(16,257) (528 / 546.8)(#### / 29.92)

10. $V_{m(std)}$ = 41.114 / 35.31 1.164

GOLDEN SPECIALTY

NCASI 94.02 Example Calculations

FACILITY:	Neucor, Inc.		DATE:	10/26/2016	
SOURCE NAME:	Press Vent #1 (East Vent)	CITY, STATE:	White Swan, WA	RUN NO:	*2

$MSF_{3/4}$ Thousand square feet of board quantity (based on 3/4" basis) per hour	Q_{sd} Flow Rate dscfm	Sample Volume mL	Volume Sampled dscm
3.22	15,183	67.0	0.024

HAP Compounds	MW
Acetaldehyde	44.05
Propionaldehyde	58.08
Methanol	32.05
Acrolein	56.06
Phenol	94.11
Formaldehyde	30.03

HAPS

M_n (µg) = Sample Result (µg/L) / Analytical Volume (mL)

Acetaldehyde	= 0.25 *	67.0 =	**< 16.8**
Propionaldehyde	= 0.25 *	67.0 =	**< 16.8**
Methanol	= 0.25 *	67.0 =	**< 16.8**
Acrolein	= 0.25 *	67.0 =	**< 16.8**
Phenol	= 0.25 *	67.0 =	**< 16.8**
Formaldehyde	= 0.05 *	67.0 =	**< 3.4**

Conversion: µg to mg = µg / 1,000

Acetaldehyde	= 16.75 /	1,000 =	**< 0.017**
Propionaldehyde	= 16.75 /	1,000 =	**< 0.017**
Methanol	= 16.75 /	1,000 =	**< 0.017**
Acrolein	= 16.75 /	1,000 =	**< 0.017**
Phenol	= 16.75 /	1,000 =	**< 0.017**
Formaldehyde	= 3.35 /	1,000 =	**< 0.003**

Concentration in Air (mg/dscm) = mg / Volume Sampled (dscm)

Acetaldehyde	= 0.017 /	0.024 =	**< 0.697**
Propionaldehyde	= 0.017 /	0.024 =	**< 0.697**
Methanol	= 0.017 /	0.024 =	**< 0.697**
Acrolein	= 0.017 /	0.024 =	**< 0.697**
Phenol	= 0.017 /	0.024 =	**< 0.697**
Formaldehyde	= 0.003 /	0.024 =	**< 0.139**

Concentration in Air (ppmvd) = (mg/dscm * 24.04) / MW

Acetaldehyde	= (0.70 *24.04)	/ 44.05 =	**< 0.381**
Propionaldehyde	= (0.70 *24.04)	/ 58.08 =	**< 0.289**
Methanol	= (0.70 *24.04)	/ 32.05 =	**< 0.523**
Acrolein	= (0.70 *24.04)	/ 56.06 =	**< 0.299**
Phenol	= (0.70 *24.04)	/ 94.11 =	**< 0.178**
Formaldehyde	= (0.14 *24.04)	/ 30.03 =	**< 0.112**

lb/hr = C_d *Q_{sd} * 60

Acetaldehyde	= (0.381	* 44.05) / (385.4 * 10^6)	* 15,183	* 60 =	**< 0.040**
Propionaldehyde	= (0.289	* 58.08) / (385.4 * 10^6)	* 15,183	* 61 =	**< 0.040**
Methanol	= (0.523	* 32.05) / (385.4 * 10^6)	* 15,183	* 62 =	**< 0.040**
Acrolein	= (0.299	* 56.06) / (385.4 * 10^6)	* 15,183	* 63 =	**< 0.040**
Phenol	= (0.178	* 94.11) / (385.4 * 10^6)	* 15,183	* 64 =	**< 0.040**
Formaldehyde	= (0.112	* 30.03) / (385.4 * 10^6)	* 15,183	* 65 =	**< 0.008**

Total HAPs = lb/hr = < 0.040 + < 0.040 + < 0.040 + < 0.040 + < 0.040 + < 0.008 = **< 0.040** ***(max DL)***

Total HAPs = lb/MSF = lb/hr / MSF/hr

Total HAPs = < 0.040 / 3.22 = **< 0.012**

USEPA METHODS 1-4
MANUAL CALCULATION FORM

Source: Press Vent #1 (West Vent) Run: 3

Test Date: 10/26/2016 Personnel: SN/AK/JA/JH

Values from Field Data Sheet

Avg. $\sqrt{\Delta P}$	0.478	T_s	546.7	°R	P_{bar}	29.38		P_s	0.10	C_p	0.84		
Avg. ΔH	1.50	T_m	526.8	°R	V_m	42.570		A_s	11.54	M_n	NA	total	
Meter Y	0.977	O_2	20.94	%	CO_2	0.05	%	V_{lc}	14.6	θ	60	min.	
Meter ΔH@	1.668				D_n	NA							

Calculated Values

1. Stack Standard Pressure = $P_s = P_{bar} + (P_{static}/13.6)$

2. Standard Sample Volume = $V_{m(std)} = \dfrac{(V_m)(Y)(528)(P_{bar} + \Delta H/13.6))}{(T_m)(29.92)}$

3. Water Vapor Collected = $V_w = (0.0415)(V_{lc})$

4. Moisture Content = Bws = $\dfrac{V_w}{(V_w + V_{m(std)})}$

5. Stack Gas Dry Molecular Weight = M_d *If "NA" for O_2 & CO_2, 29.0 from Section 8.6 of Method 2 was used.*

   $M_d = 0.44(CO_2\%) + 0.32(O_2\%) + 0.28(100-(CO_2\%+O_2\%))$

6. Stack Gas Molecular Weight = $M_s = M_d(1-B_{ws}) + 18(B_{ws})$

7. Stack Gas Velocity = $V_s = 85.49\ (C_p)\ (\text{Avg. } \sqrt{\Delta P})\ (\sqrt{(T_s/(M_s P_s))})$

8. Stack Gas Velocity = ACFM = V_s X 60 X A_s

9. Stack Gas Dry Volumetric Flow, dscfm = $Q_{std} = (1.00 - B_{ws})\ (\text{ACFM})\ (528/T_s)\ (P_s/29.92)$

10. Conversion = dscf to dscm = $V_{m(std)} = V_{m(std)} / 35.31$

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USEPA METHODS 1-4
MANUAL CALCULATION FORM

Source: Press Vent #1 (West Vent) Run #: 3
Test Date: 10/26/16 Completed By: SN/AK/JA/JH

Values from Field Data Sheet

Avg. $\sqrt{\Delta P}$	0.478	T_s	546.7	°R	P_{bar}	29.38	P_s	0.1	C_p	0.84	
Avg. ΔH	1.500	T_m	526.8	°R	V_m	42.570	A_s	11.54	M_n	NA	
Meter Y	0.977	O_2	20.94		CO_2	0.05	V_{lc}	14.6	θ	60	min.
Meter ΔH@	1.668				D_n	NA					

Calculated Values

1. P_s = (29.38) + (0.1 / 13.6) = 29.39

2. $V_{m(std)}$ = $\frac{(42.570)(0.977)(528)(29.38 + 1.50/13.6)}{(526.8)(29.92)}$ = 41.091

3. V_w = (0.04715)(14.6) = 0.69

4. B_{ws} = (0.69)/ (0.69 + 41.091) = 0.0165

5. M_d = 0.44(0.05)+ 0.32(20.94)+ 0.28(100- (0.05 + 20.94)) = 28.84

6. M_s = (28.84)(1- 0.0165) + 18 (0.0165) = 28.67

7. v_s = 85.49(###)(0.478)($\sqrt{}$(546.7 / 28.67 * 29.39)) = 27.64

8. ACFM = (27.64)(60)(11.54) 19,139

9. Stack Gas Dry Volumetric Flow, dscfm = Q_{std} = 17,856
(1 - 0.0165)(19,139) (528 / 546.7)(#### / 29.92)

10. $V_{m(std)}$ = 41.091 / 35.31 1.164

GOLDEN SPECIALTY

NCASI 94.02 Example Calculations

FACILITY:	Neucor, Inc.		DATE:	10/26/2016	
SOURCE NAME:	Press Vent #1 (West Vent)	CITY, STATE:	White Swan, WA	RUN NO:	3

$MSF_{3/4}$ Thousand square feet of board quantity (based on 3/4" basis) per hour	Q_{sd} Flow Rate dscfm	Sample Volume mL	Volume Sampled dscm
3.33	17,856	74.0	0.023

HAP Compounds	MW
Acetaldehyde	44.05
Propionaldehyde	58.08
Methanol	32.05
Acrolein	56.06
Phenol	94.11
Formaldehyde	30.03

HAPS

M_n (µg) = Sample Result (µg/L) / Analytical Volume (mL)

Acetaldehyde	= 0.25 *	74.0 =	**< 18.5**
Propionaldehyde	= 0.25 *	74.0 =	**< 18.5**
Methanol	= 0.25 *	74.0 =	**< 18.5**
Acrolein	= 0.25 *	74.0 =	**< 18.5**
Phenol	= 0.25 *	74.0 =	**< 18.5**
Formaldehyde	= 0.05 *	74.0 =	**< 3.70**

Conversion: µg to mg = µg / 1,000

Acetaldehyde	= 18.50 /	1,000 =	**< 0.019**
Propionaldehyde	= 18.50 /	1,000 =	**< 0.019**
Methanol	= 18.50 /	1,000 =	**< 0.019**
Acrolein	= 18.50 /	1,000 =	**< 0.019**
Phenol	= 18.50 /	1,000 =	**< 0.019**
Formaldehyde	= 3.70 /	1,000 =	**< 0.004**

Concentration in Air (mg/dscm) = mg / Volume Sampled (dscm)

Acetaldehyde	= 0.019 /	0.023 =	**< 0.802**
Propionaldehyde	= 0.019 /	0.023 =	**< 0.802**
Methanol	= 0.019 /	0.023 =	**< 0.802**
Acrolein	= 0.019 /	0.023 =	**< 0.802**
Phenol	= 0.019 /	0.023 =	**< 0.802**
Formaldehyde	= 0.004 /	0.023 =	**< 0.160**

Concentration in Air (ppmvd) = (mg/dscm * 24.04) / MW

Acetaldehyde	= (0.80 *24.04)	/ 44.05 =	**< 0.437**
Propionaldehyde	= (0.80 *24.04)	/ 58.08 =	**< 0.332**
Methanol	= (0.80 *24.04)	/ 32.05 =	**< 0.601**
Acrolein	= (0.80 *24.04)	/ 56.06 =	**< 0.344**
Phenol	= (0.80 *24.04)	/ 94.11 =	**< 0.205**
Formaldehyde	= (0.16 *24.04)	/ 30.03 =	**< 0.128**

lb/hr = C_d *Q_{sd} * 60

Acetaldehyde	= (0.437	* 44.05) / (385.4 * 10^6)	* 17,856 * 60 =	**< 0.054**
Propionaldehyde	= (0.332	* 58.08) / (385.4 * 10^6)	* 17,856 * 61 =	**< 0.054**
Methanol	= (0.601	* 32.05) / (385.4 * 10^6)	* 17,856 * 62 =	**< 0.054**
Acrolein	= (0.344	* 56.06) / (385.4 * 10^6)	* 17,856 * 63 =	**< 0.054**
Phenol	= (0.205	* 94.11) / (385.4 * 10^6)	* 17,856 * 64 =	**< 0.054**
Formaldehyde	= (0.128	* 30.03) / (385.4 * 10^6)	* 17,856 * 65 =	**< 0.011**

Total HAPs = lb/hr = < 0.054 + < 0.054 + < 0.054 + < 0.054 + < 0.054 + < 0.011 = **< 0.054** ***(max DL)***

Total HAPs = lb/MSF = lb/hr / MSF/hr

Total HAPs = < 0.054 / 3.33 = **< 0.016**

USEPA METHODS 1-4
MANUAL CALCULATION FORM

Source: Line Former #1 Run: 2

Test Date: 10/27/2016 Personnel: SN/AK/JA/JH

Values from Field Data Sheet

Avg. $\sqrt{\Delta P}$	0.361	T_s	536.0	°R	P_{bar}	28.90		P_s	0.15	C_p	0.84		
Avg. ΔH	1.50	T_m	516.0	°R	V_m	42.304		A_s	9.33	M_n	NA	total	
Meter Y	1.010	O_2	20.98	%	CO_2	0.03	%	V_{lc}	16.4	θ	60	min.	
Meter ΔH@	1.589				D_n	NA							

Calculated Values

1. Stack Standard Pressure = $P_s = P_{bar} + (P_{static}/13.6)$

2. Standard Sample Volume = $V_{m(std)} = \dfrac{(V_m)(Y)(528)(P_{bar} + \Delta H/13.6)}{(T_m)(29.92)}$

3. Water Vapor Collected = $V_w = (0.0415)(V_{lc})$

4. Moisture Content = Bws = $\dfrac{V_w}{(V_w + V_{m(std)})}$

5. Stack Gas Dry Molecular Weight = M_d *If "NA" for O_2 & CO_2, 29.0 from Section 8.6 of Method 2 was used.*

   $M_d = 0.44(CO_2\%) + 0.32(O_2\%) + 0.28(100-(CO_2\%+O_2\%))$

6. Stack Gas Molecular Weight = $M_s = M_d(1-B_{ws}) + 18(B_{ws})$

7. Stack Gas Velocity = $V_s = 85.49\ (C_p)\ (\text{Avg. } \sqrt{\Delta P})\ (\sqrt{(T_s/(M_s P_s))})$

8. Stack Gas Velocity = ACFM = V_s X 60 X A_s

9. Stack Gas Dry Volumetric Flow, dscfm = $Q_{std} = (1.00 - B_{ws})\ (\text{ACFM})\ (528/T_s)\ (P_s/29.92)$

10. Conversion = dscf to dscm = $V_{m(std)} = V_{m(std)}$ / 35.31

USEPA METHODS 1-4
MANUAL CALCULATION FORM

Source: Line Former #1 Run #: 2
Test Date: 10/27/16 Completed By: SN/AK/JA/JH

Values from Field Data Sheet

Avg. $\sqrt{\Delta P}$	0.361	T_s	536.0	°R	P_{bar}	28.90	P_s	0.2	C_p	0.84	
Avg. ΔH	1.500	T_m	516.0	°R	V_m	42.304	A_s	9.33	M_n	NA	
Meter Y	1.010	O_2	20.98		CO_2	0.03	V_{lc}	16.4	θ	60	min.
Meter ΔH@	1.589				D_n	NA					

Calculated Values

1. P_s = (28.90) + (0.2 / 13.6) = 28.91

2. $V_{m(std)}$ = $\frac{(42.304)(1.010)(528)(28.90 + 1.50/13.6)}{(516.0)(29.92)}$ = 42.391

3. V_w = (0.04715)(16.4) = 0.77

4. B_{ws} = (0.77)/ (0.77 + 42.391) = 0.0179

5. M_d = 0.44(0.03)+ 0.32(20.98)+ 0.28(100- (0.03 + 20.98)) = 28.84

6. M_s = (28.84)(1- 0.0179) + 18 (0.0179) = 28.65

7. v_s = 85.49(###)(0.361)(√(536.0 / 28.65 * 28.91)) = 20.83

8. ACFM = (20.83)(60)(9.33) 11,664

9. Stack Gas Dry Volumetric Flow, dscfm = Q_{std} = 10,903
(1 - 0.0179)(11,664) (528 / 536.0)(28.91 / 29.92)

10. $V_{m(std)}$ = 42.391 / 35.31 1.201

GOLDEN SPECIALTY

NCASI 94.02 Example Calculations

FACILITY:	Neucor, Inc.		DATE:	10/27/2016	
SOURCE NAME:	Line Former #1	CITY, STATE:	White Swan, WA	RUN NO:	2

ODT Oven Dried Ton	Q_{sd} Flow Rate dscfm	Sample Volume mL	Volume Sampled dscm
3.17	10,903	76.0	0.024

HAP Compounds	MW
Acetaldehyde	44.05
Propionaldehyde	58.08
Methanol	32.05
Acrolein	56.06
Phenol	94.11
Formaldehyde	30.03

HAPS

M_n (µg) = Sample Result (µg/L) / Analytical Volume (mL)

Acetaldehyde	= 0.25 *	76.0 =	**< 19.0**
Propionaldehyde	= 0.25 *	76.0 =	**< 19.0**
Methanol	= 0.25 *	76.0 =	**< 19.0**
Acrolein	= 0.25 *	76.0 =	**< 19.0**
Phenol	= 0.25 *	76.0 =	**< 19.0**
Formaldehyde	= 0.05 *	76.0 =	**< 3.8**

Conversion: µg to mg = µg / 1,000

Acetaldehyde	= 19.00 /	1,000 =	**< 0.019**
Propionaldehyde	= 19.00 /	1,000 =	**< 0.019**
Methanol	= 19.00 /	1,000 =	**< 0.019**
Acrolein	= 19.00 /	1,000 =	**< 0.019**
Phenol	= 19.00 /	1,000 =	**< 0.019**
Formaldehyde	= 3.80 /	1,000 =	**< 0.004**

Concentration in Air (mg/dscm) = mg / Volume Sampled (dscm)

Acetaldehyde	= 0.019 /	0.024 =	**< 0.799**
Propionaldehyde	= 0.019 /	0.024 =	**< 0.799**
Methanol	= 0.019 /	0.024 =	**< 0.799**
Acrolein	= 0.019 /	0.024 =	**< 0.799**
Phenol	= 0.019 /	0.024 =	**< 0.799**
Formaldehyde	= 0.004 /	0.024 =	**< 0.160**

Concentration in Air (ppmvd) = (mg/dscm * 24.04) / MW

Acetaldehyde	= (0.799 *24.04)	/ 44.05 =	**< 0.436**
Propionaldehyde	= (0.799 *24.04)	/ 58.08 =	**< 0.331**
Methanol	= (0.799 *24.04)	/ 32.05 =	**< 0.599**
Acrolein	= (0.799 *24.04)	/ 56.06 =	**< 0.342**
Phenol	= (0.799 *24.04)	/ 94.11 =	**< 0.204**
Formaldehyde	= (0.160 *24.04)	/ 30.03 =	**< 0.128**

lb/hr = C_d *Q_{sd} * 60

Acetaldehyde	= (0.436	* 44.05) / (385.4 * 10^6)	* 10,903 * 60 =	**< 0.033**
Propionaldehyde	= (0.331	* 58.08) / (385.4 * 10^6)	* 10,903 * 61 =	**< 0.033**
Methanol	= (0.599	* 32.05) / (385.4 * 10^6)	* 10,903 * 62 =	**< 0.033**
Acrolein	= (0.342	* 56.06) / (385.4 * 10^6)	* 10,903 * 63 =	**< 0.033**
Phenol	= (0.204	* 94.11) / (385.4 * 10^6)	* 10,903 * 64 =	**< 0.033**
Formaldehyde	= (0.128	* 30.03) / (385.4 * 10^6)	* 10,903 * 65 =	**< 0.007**

Total HAPs = lb/hr = < 0.033 + < 0.033 + < 0.033 + < 0.033 + < 0.033 + < 0.007 = **< 0.033** ***(max DL)***

Total HAPs = lb/ODT = lb/hr / ODT/hr

Total HAPs = < 0.033 / 3.17 = **< 0.010**

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USEPA METHODS 1-4
MANUAL CALCULATION FORM

Source: Dryer Vent # 1 Run: 1

Test Date: 10/27/2016 Personnel: SN/AK/JA/JH

Values from Field Data Sheet

Avg. $\sqrt{\Delta P}$	1.304	T_s	599.0	°R	P_{bar}	28.90		P_s	0.81	C_p	0.84		
Avg. ΔH	1.50	T_m	517.8	°R	V_m	40.423		A_s	11.54	M_n	NA	total	
Meter Y	1.010	O_2	20.96	%	CO_2	0.03	%	V_{lc}	82.7	θ	60	min.	
Meter ΔH@	1.589				D_n	NA							

Calculated Values

1. Stack Standard Pressure = $P_s = P_{bar} + (P_{static}/13.6)$

2. Standard Sample Volume = $V_{m(std)} = \dfrac{(V_m)(Y)(528)(P_{bar} + \Delta H/13.6))}{(T_m)(29.92)}$

3. Water Vapor Collected = $V_w = (0.0415)(V_{lc})$

4. Moisture Content = Bws = $\dfrac{V_w}{(V_w + V_{m(std)})}$

5. Stack Gas Dry Molecular Weight = M_d *If "NA" for O_2 & CO_2, 29.0 from Section 8.6 of Method 2 was used.*

   $M_d = 0.44(CO_2\%) + 0.32(O_2\%) + 0.28(100-(CO_2\%+O_2\%))$

6. Stack Gas Molecular Weight = $M_s = M_d(1-B_{ws}) + 18(B_{ws})$

7. Stack Gas Velocity = $V_s = 85.49\ (C_p)\ (\text{Avg. } \sqrt{\Delta P})\ (\sqrt{(T_s/(M_s P_s))})$

8. Stack Gas Velocity = ACFM = V_s X 60 X A_s

9. Stack Gas Dry Volumetric Flow, dscfm = $Q_{std} = (1.00 - B_{ws})\ (\text{ACFM})\ (528/T_s)\ (P_s/29.92)$

10. Conversion = dscf to dscm = $V_{m(std)} = V_{m(std)} / 35.31$

USEPA METHODS 1-4
MANUAL CALCULATION FORM

Source: Dryer Vent # 1 Run #: 1
Test Date: 10/27/16 Completed By: SN/AK/JA/JH

Values from Field Data Sheet

Avg. $\sqrt{\Delta P}$	1.304	T_s	599.0	°R	P_{bar}	28.90	P_s	0.8	C_p	0.84	
Avg. ΔH	1.500	T_m	517.8	°R	V_m	40.423	A_s	11.54	M_n	NA	
Meter Y	1.010	O_2	20.96		CO_2	0.03	V_{lc}	82.7	θ	60	min.
Meter ΔH@	1.589				D_n	NA					

Calculated Values

1. P_s = (28.90) + (0.8 / 13.6) = **28.96**

2. $V_{m(std)}$ = $\frac{(40.423)(1.010)(528)(28.90 + 1.50/13.6)}{(517.8)(29.92)}$ = **40.363**

3. V_w = (0.04715)(82.7) = **3.90**

4. B_{ws} = (3.90)/ (3.90 + 40.363) = **0.0881**

5. M_d = 0.44(0.03)+ 0.32(20.96)+ 0.28(100- (0.03 + 20.96)) = **28.84**

6. M_s = (28.84)(1- 0.0881) + 18 (0.0881) = **27.89**

7. v_s = 85.49(###)(1.304)(√(599.0 / 27.89 * 28.96)) = **80.64**

8. ACFM = (80.64)(60)(11.54) **55,838**

9. Stack Gas Dry Volumetric Flow, dscfm = Q_{std} = **43,443**
(1 - 0.0881)(55,838) (528 / 599.0)(28.96 / 29.92)

10. $V_{m(std)}$ = 40.363 / 35.31 **1.143**

GOLDEN SPECIALTY

NCASI 94.02 Example Calculations

FACILITY:	Neucor, Inc.		DATE:	10/27/2016	
SOURCE NAME:	Dryer Vent # 1	CITY, STATE:	White Swan, WA	RUN NO:	1

ODT Oven Dried Ton	Q_{sd} Flow Rate dscfm	Sample Volume mL	Volume Sampled dscm
2.85	43,443	76.0	0.024

HAP Compounds	MW
Acetaldehyde	44.05
Propionaldehyde	58.08
Methanol	32.05
Acrolein	56.06
Phenol	94.11
Formaldehyde	30.03

HAPS

M_n (µg) = Sample Result (µg/L) / Analytical Volume (mL)

Acetaldehyde	= 0.25 *	76.0 =	**< 19.0**
Propionaldehyde	= 0.25 *	76.0 =	**< 19.0**
Methanol	= 0.25 *	76.0 =	**< 19.0**
Acrolein	= 0.25 *	76.0 =	**< 19.0**
Phenol	= 0.25 *	76.0 =	**< 19.0**
Formaldehyde	= 0.05 *	76.0 =	**< 3.8**

Conversion: µg to mg = µg / 1,000

Acetaldehyde	= 19.00 /	1,000 =	**< 0.019**
Propionaldehyde	= 19.00 /	1,000 =	**< 0.019**
Methanol	= 19.00 /	1,000 =	**< 0.019**
Acrolein	= 19.00 /	1,000 =	**< 0.019**
Phenol	= 19.00 /	1,000 =	**< 0.019**
Formaldehyde	= 3.80 /	1,000 =	**< 0.004**

Concentration in Air (mg/dscm) = mg / Volume Sampled (dscm)

Acetaldehyde	= 0.019 /	0.024 =	**< 0.798**
Propionaldehyde	= 0.019 /	0.024 =	**< 0.798**
Methanol	= 0.019 /	0.024 =	**< 0.798**
Acrolein	= 0.019 /	0.024 =	**< 0.798**
Phenol	= 0.019 /	0.024 =	**< 0.798**
Formaldehyde	= 0.004 /	0.024 =	**< 0.160**

Concentration in Air (ppmvd) = (mg/dscm * 24.04) / MW

Acetaldehyde	= (0.80 *24.04)	/ 44.05 =	**< 0.435**
Propionaldehyde	= (0.80 *24.04)	/ 58.08 =	**< 0.330**
Methanol	= (0.80 *24.04)	/ 32.05 =	**< 0.598**
Acrolein	= (0.80 *24.04)	/ 56.06 =	**< 0.342**
Phenol	= (0.80 *24.04)	/ 94.11 =	**< 0.204**
Formaldehyde	= (0.16 *24.04)	/ 30.03 =	**< 0.128**

lb/hr = C_d *Q_{sd} * 60

Acetaldehyde	= (0.435	* 44.05) / (385.4 * 10^6)	* 43,443	* 60 =	**< 0.130**
Propionaldehyde	= (0.330	* 58.08) / (385.4 * 10^6)	* 43,443	* 61 =	**< 0.130**
Methanol	= (0.598	* 32.05) / (385.4 * 10^6)	* 43,443	* 62 =	**< 0.130**
Acrolein	= (0.342	* 56.06) / (385.4 * 10^6)	* 43,443	* 63 =	**< 0.130**
Phenol	= (0.204	* 94.11) / (385.4 * 10^6)	* 43,443	* 64 =	**< 0.130**
Formaldehyde	= (0.128	* 30.03) / (385.4 * 10^6)	* 43,443	* 65 =	**< 0.026**

Total HAPs = lb/hr = < 0.130 + < 0.130 + < 0.130 + < 0.130 + < 0.130 + < 0.026 = **< 0.130** ***(max DL)***

Total HAPs = lb/ODT = lb/hr / ODT/hr

Total HAPs = < 0.130 / 2.85 = **< 0.045**

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GOLDEN SPECIALTY

APPENDIX D – Field Data

FIELD DATA SHEET 1
Sampling Velocity Traverse Points

FORM# GSC-RM001-001
REV 2015-02, EFF 7/7/15

Client/Plant Name Nelson, White Swan. Job# 16.282

City/State White Swan, WA Date/Time 10/24/16

Test Location Press Vents (East and West) Personnel SN/AC/JH/JA

Port Inside Diameter	3 inches		
Distance from Far Wall to Outside of Port	50 inches		
Nipple Length and/or Wall Thickness	4 inches		
Stack/Duct (√) Blue Print ( )	Measured (√)		
Depth/Diameter (>12 in. ?)	46 inches		
Width (if rectangular)	—		
Equiv. Diameter (if rect.) $D_e = 2\,D\,W/(D + W)$	—		
Area (A) (>113in.²?) $A = \pi D^2/4$ or $D\,W$	11.54 ft²		
Distance From Flow Disturbance to Port	Distance	D_e	No. Pts*
Upstream (≥ 0.5 D_e?)	25"	0.54	24
Downstream (≥ 2.0 D_e?)	95"	2.1	24
Cyclonic Flow Checked?	Yes	No	NA
Rectangular Matrix	—		

*Circle larger of two

Pt.	%Duct Depth	Dist from Inside Wall*	Dist from Oustide of Port
1	2.1	1.0	5.0
2	6.7	3.1	7.1
3	11.8	5.4	9.4
4	17.7	8.1	12.1
5	25.0	11.5	15.5
6	35.6	16.4	20.4
7	64.4	29.6	33.6
8	75.0	34.5	38.5
9	82.3	37.9	41.9
10	88.2	40.6	44.6
11	93.3	42.9	46.9
12	97.9	45.0	49.0
13			
14			
15			
16			
17			
18			
19			
20			

*Do not place closer to stack walls than:
1.0 in. for stack dia > 24 in.
0.5 in. for stack dia 12 to ≤ 24 in.

Sketch of Location: In the space above, sketch a flow diagram of the test location; show the distance from the ports to the distrubances before & after. Sketch the cross-sectional area; show sampling port locations. In horizontal ducts, check for dust buildups & measure or estimate the depth.

QA/QC Check
Completeness ✓ Legibility ✓ Accuracy ✓ Specifications ✓ Reasonableness ✓

Checked by: _____ Personnel (Signature/Date) _____ Team Leader (Signature/Date)

GOLDEN SPECIALTY

CYCLONIC FLOW DETERMINATION

FORM # GSC-RM001-003
REV 2015-01, EFF 3/19/15

Plant Name Neenah
City/State White Swan, WA
Test Loc. Press Vent Exit
Barometric Pres. (Pbar) 29.04 In. Hg
Pitot/Orfices ID M WA-5-2
Thermocouple ID TC-M WA-5-2

Job No. 160282
Date 10/26/16
Personnel SN/TK/JH/AK
Static Pres. (Pg) 0.1 in. H_2O
Pitot Coef. (C_p) 0.84 Pres. Gauge Set ID RET-1
Duct/Stack Dimensions 46 inches

Pitot Tube Leak Checks	Ok ?	in H_2O
Pre-test (-)	✓	4
Pre-test (+)	✓	4
Post-test (-)	✓	4
Post-test (+)	✓	4

CYCLONIC FLOW CHECK
Start - Finish Times
10:16 - 10:32

Note: Yaw angle average is sum of the absolute values divided by the number of measurements, and must be <20°.

Test Pt.	Yaw Angle. °ø
A-1	0
A-2	0
A-3	0
A-4	5
A-5	-5
A-6	-5
A-7	-5
A-8	0
A-9	0
A-10	0
A-11	10
A-12	0
B-1	0
B-2	0
B-3	0
B-4	0
B-5	0
B-6	0
B-7	0
B-8	0
B-9	0
B-10	0
B-11	5
B-12	5
Avg.	1.67

CYCLONIC FLOW DETERMINATION

FORM # GSC-RM001-003
REV 2015-01, EFF 3/19/15

Plant Name: Nexcor
Job No.: ~~10/26/16~~ 160282 (SM 10-26)
City/State: White Swan, WA
Date: 10/26/16
Test Loc.: Press Vent West
Personnel: SM / JA / JH / AK
Barometric Pres. (Pbar): 24.04 In. Hg
Static Pres. (Pg): 0.1 in. H_2O
Pitot/Orfices ID: M 4-5-1
Pitot Coef. (C_p): 0.84
Pres. Gauge Set ID: CCI-4
Thermocouple ID: TC-M4-5-1
Duct/Stack Dimensions: 46 inches

Pitot Tube Leak Checks	Ok ?	in H_2O
Pre-test (-)	✓	4
Pre-test (+)	✓	
Post-test (-)	✓	
Post-test (+)	✓	

CYCLONIC FLOW CHECK
Start - Finish Times
10:05 - 10:15

Note: Yaw angle average is sum of the absolute values divided by the number of measurements, and must be <20°.

Test Pt.	Yaw Angle. °ø
A-1	0
A-2	0
A-3	5
A-4	0
A-5	-5
A-6	-5
A-7	0
A-8	0
A-9	10
A-10	0
A-11	0
A-12	0
B-1	10
B-2	10
B-3	0
B-4	0
B-5	0
B-6	0
B-7	0
B-8	0
B-9	5
B-10	0
B-11	0
B-12	0
Avg.	2.08

GOLDEN SPECIALTY

USEPA Method 5/202 Field Data Sheet

Test Date: 10/25/16
Project Number: 160282
Location: NEucon
Process: Press vent EAST
Source Name: Press vent R
Operators: AK JH
Run Number: R R1 EAST

Filter Number: 2-3585
Nozzle ID: glass-1
Nozzle Dia. (in.): 0.3292
Meter Box ID: RET-1
ΔH@: 1.668
Meter Y: 0.977
P_{bar} (in. H_g): 29.04
P_{static} (in. H_2O): 0.1

Train ID: 2
Hot Box ID: —
Pitot Coeff: 0.84
Probe/Pitot ID: MU-52
Stack TC ID: TC-MU-52
Probe TC ID: TC-MU-52
Effective Length: 5ft
Liner (SS, glass): glass
Stack Diam/LxW: 46"

Leak Checks

Pitot Line	OK ?	in H2O ?
Pre-test (-):	✓	5
Pre-test (+):	✓	5
Post-test (-):	✓	5
Post-test (+):	✓	5

Sample Train	(Pretest)	(Post test)
Leak Rate:	0.015	0.010
Vac:	15"	-7
If needed: (Mid) Leak Rate:		(Mid)
Vac:		

Traverse Point	Clock Time	Elapsed Time	ΔP (in. H_2O)	Meter Conditions ΔH	Meter Volume	Temperature (°F) Stack	Probe	Oven	Meter (°F) In	Out	Imp Out (°F)	Vac (in. Hg)	202 Filter	K
A5-1	1036	0	0.15	1.7	616.401	85	258	250	60	64	65	4	69	11.1
2		5	0.19	2.1	620.1	85	256	248	60	74	51	4	69	
3		10	0.17	1.9	624.3	85	254	251	62	81	51	4	69	
4	1052/1056	15	0.19	2.1	628.4	85	250	250	63	80	54	4	69	
5		20	0.19	2.1	632.4	85	252	246	64	84	56	4	69	
6		25	0.17	1.9	636.6	85	251	252	65	87	56	4	68	
7		30	0.17	1.9	640.8	86	260	248	66	90	59	4	68	
8		35	0.15	1.7	644.9	87	262	247	67	92	65	4	68	
9		40	0.16	1.8	648.8	84	263	248	68	95	61	4	69	
10		45	0.17	1.9	652.3	85	261	247	69	95	58	4	68	
11		50	0.17	1.9	656.5	87	263	249	69	97	57	4	68	
12		55	0.16	1.8	660.6	88	261	248	70	97	57	4	69	
12	11:38	60	—	—	664.92	—	—	change points			—	—	—	
B-1	11:43	65	0.16	1.8	664.592	86	261	249	71	99	59	4	68	
2		70	0.15	1.7	668.5	86	261	250	72	98	61	3.75	68	
3		75	0.15	1.7	672.4	86	262	250	73	98	61	3.5	69	
4		80	0.15	1.7	676.3	86	262	249	73	97	62	3.5	69	
5		85	0.15	1.7	680.2	86	261	250	73	96	63	3.5	69	
6		90	0.15	1.7	684.0	86	262	250	73	95	63	3.5	69	
7		95	0.15	1.7	687.8	86	260	249	73	95	63	3.5	68	
8		100	0.15	1.7	691.7	86	263	250	73	94	63	3.5	68	
9		105	0.16	1.8	695.54	86	261	249	73	95	63	3.5	68	
10		110	0.15	1.7	699.45	86	260	249	72	94	63	3.5	68	
11		115	0.15	1.7	703.31	86	262	249	73	96	64	3.5	69	
12	12:43	120	0.15	1.7	707.15	87	262	249	73	96	65	3.5	69	
					710.982									

SPECIALTY

Plant	Nexeo 160282	Date	10/25/16
Run Number	R1 East	Method No.	5/202
Sample Location	Press Vent - East	Train No.	1
Setup Technician	SN	Cleanup Technician	SN

Back-Half Catch

	Impinger 1	Impinger 2	Impinger 3	Impinger 4	Impinger 5	Impinger 6	Impinger 7
Final Weights (grams)	506.5	626.4	740.4	913.9			
Initial Weight (grams)	506.5	626.4	739.0	887.3			
Net Gain (grams)	0.0	0.0	1.4	26.6			

Method 202 Purge Temp (F)	% Silica Gel Spent
0 mins	0
10 mins	
20 mins	85%.
30 mins	
40 mins	
50 mins	
60 mins	

Total Impinger Catch (grams) 28.0

Back Half Wash Solution(s) H_2O, Acetone, Hexane.

Impinger Charge Solution(s) H_2O

Post-test Impinger solution appearance: Clear

Filter Identifications and Recoveries

	In-Stack Filter	Hot Box Filter	Method 202
Filter #		2-3585	

Filter Notes: Layer of lint on filter.

Front Half Wash solution(s) Acetone

Sample Bottles

	Front Half			Back- Half			
	Container # 1	Container # 2	Container #	Container # 1	Container # 2	Container # 3	Container #
Description/ Contents	Filter	Acetone		DI H_2O	Acetone/ Hexane	CPM filter.	
Sample ID	M5/202 -C1-R1 East	M5/202 -C2 -R1 East		M5/202 -CPM1 -R1 East	M5/202 -CPM2 -R1 East	M5/202 -CPM3 -R1 East	
Final Wt	—	264.1		486.3	266.4	—	
Tare Wt	—	210.8		288.8	178.2	—	
Net Wash Wt	—	53.3		197.5	88.2	—	

GOLDEN SPECIALTY

USEPA Method 5/202 Field Data Sheet

Test Date: 10/25/16
Project Number: 160287
Location: Nexco
Process: Press Vent
Source Name: Press Vent R
Operators: JH
SN 10/25/16
Run Number: ~~2~~ 2 EAST

Filter Number: 2-3597
Nozzle ID: gem-1
Nozzle Dia. (in.): 0.3292
Meter Box ID: RET-1
ΔH@: 1.668
Meter Y: 0.977
P_{bar} (in. H_g): 29.04
P_{static} (in. H_2O): 0.1

Train ID: 1
Hot Box ID: —
Pitot Coeff: 0.84
Probe/Pitot ID: MW-5-2
Stack TC ID: TC MW-5-2
Probe TC ID: TC MW-5-2
Effective Length: 58'
Liner (SS, glass): glass
Stack Diam/LxW: 48"

Leak Checks

Pitot Line	OK ?	in H2O ?
Pre-test (-):	✓	4
Pre-test (+):	✓	4
Post-test (-):	✓	4
Post-test (+):	✓	4

Sample Train	(Pretest)	(Post test)
Leak Rate:	0.010	0.010
Vac:	-15	5"
If needed:	(Mid)	(Mid)
Leak Rate:		
Vac:		

Traverse Point	Clock Time	Elapsed Time	ΔP (in. H_2O)	Meter Conditions ΔH	Meter Conditions Meter Volume	Temperature (°F) Stack	Probe	Oven	Meter (°F) In	Out	Imp Out (°F)	Vac (in. Hg)		K
A-1	14:30 ~~229~~ PM	0	0.15	1.7	711.472	86	261	250	67	80	61	4.0	68	11.1
2	14:35	5	0.15	1.7	715.15	90	256	251	67	86	60	4.0	69	
3	14:40	10	0.16	1.8	718.91	90	254	249	67	86	63	4.0	68	
4	14:45	15	0.16	1.8	722.73	90	262	250	65	88	67	4.0	69	
5	14:50	20	0.16	1.8	726.55	88	255	250	67	88	70	4.0	69	
6	14:55	25	0.15	1.7	730.51	88	259	251	69	87	73	4.0	69	
7	15:00	30	0.16	1.8	734.42	90	262	250	69	88	74	4.0	68	
8	15:05	35	0.16	1.8	738.28	91	244	250	69	88	75	4.0	68	
9	15:10	40	0.16	1.8	742.12	89	261	251	69	90	70	4.0	69	
10	15:15	45	0.16	1.8	745.99	90	261	250	69	90	69	4.0	69	
11	15:20	50	0.16	1.8	749.88	88	261	251	70	89	60	4.0	69	
12	15:25	55	0.15	1.7	753.76	91	262	250	70	91	59	4.0	69	
~~12~~ SN 10/25/16	15:30	60	—	—	757.621	—	— CHANGE PORT			—	—	—	—	
B-1	15:40	~~65~~ 60	0.15	1.7	757.621	91	255	250	70	92	60	4.0	68	
2	18:23	~~70~~ 65	0.15	1.7	761.47	87	260	250	JH 10/25 ~~70~~ 57	58	65	4.0	68	
3	18:28	~~75~~ 70	0.15	1.7	765.21	87	256	250	57	64	64	4.0	68	
4	18:33	~~80~~ 75	0.15	1.7	768.86	87	255	251	56	70	64	4.0	68	
5	18:38	~~85~~ 80	0.15	1.7	772.58	87	262	250	57	74	64	4.0	68	
6	18:43	~~90~~ 85	0.15	1.7	776.32	86	262	251	57	76	63	4.0	69	
7	18:48	~~95~~ 90	0.15	1.7	780.03	86	262	250	58	79	63	4.0	67	
8	18:53	~~100~~ 95	0.15	1.7	783.73	87	262	251	58	80	64	4.0	68	
9	18:58	~~105~~ 100	0.15	1.7	787.45	85	240	251	58	82	63	4.0	68	
10	19:03	~~110~~ 105	0.15	1.7	791.20	85	263	250	59	82	62	4.0	67	
11	19:08	~~115~~ 110	0.15	1.7	794.98	86	260	252	59	83	61	4.0	68	
12	19:13	115	0.15	1.7	798.8	86	260	252	59	86	60	4.0	68	
SN 10/25/16 ~~12~~	19:18	120	—	—	802.708									

END RUN

SPECIALTY

Plant	Nemor 160282	Date	10/25/16
Run Number	R2 East	Method No.	5/202
Sample Location	Press Vent - East	Train No.	1
Setup Technician	SN	Cleanup Technician	SN

Back-Half Catch

	Impinger 1	Impinger 2	Impinger 3	Impinger 4	Impinger 5	Impinger 6	Impinger 7
Final Weights (grams)	380.2	537.0	748.3	920.0			
Initial Weight (grams)	380.2	537.0	747.8	896.8			
Net Gain (grams)	0.0	0.0	0.5	23.2			

Method 202	% Silica Gel Spent
Purge Temp (F)	0
0 mins	
10 mins	
20 mins	60%
30 mins	
40 mins	
50 mins	
60 mins	

Total Impinger Catch (grams) 23.7

Back Half Wash Solution(s) DI H_2O / Acetone

Impinger Charge Solution(s) DI H_2O

Post-test Impinger solution appearance: Clear

Filter Identifications and Recoveries

	In-Stack Filter	Hot Box Filter	Method 202
Filter #		2-3587	

Filter Notes: None

Front Half Wash solution(s) Acetone

Sample Bottles

	Front Half			Back- Half			
	Container # 1	Container # 2	Container #	Container # 1	Container # 2	Container # 3	Container #
Description/ Contents	Filter	Acetone		DI H_2O	Acetone / Hexane	Filter	
Sample ID	M5/202 -C1- R2 East	M5/202 -C2-R2 East		M5/202- CPM1 -R2 East	M5/202 -CPM2 -R2 East	M5/202-CPM3 -R2 East	
Final Wt	—	274.0		432.7	247.1	—	
Tare Wt	—	209.3		280.8	172.2	—	
Net Wash Wt	—	64.7		151.9	74.9	—	

GOLDEN SPECIALTY

USEPA Method 5/202 Field Data Sheet

Page ___ of ___

Test Date:	10/26/16	Filter Number:	2-3603
Project Number:	160282	Nozzle ID:	gerson
Location:	Nencor	Nozzle Dia. (in.):	0.3292
Process:	press vent	Meter Box ID:	RFT-1
Source Name:	press vent east	ΔH@:	1.668
Operators:	JH SN JA AA	Meter Y:	0.977
		P_{bar} (in. H_g):	29.38
		P_{static} (in. H_2O):	0.1
Run Number:	3 EAST		

Train ID	1
Hot Box ID	—
Pitot Coeff:	0.84
Probe/Pitot ID:	M4-52
Stack TC ID:	TC-M4-52
Probe TC ID:	TC-M4-52
Effective Length:	5ft
Liner (SS, glass):	glass
Stack Diam/LxW	36"

Leak Checks

Pitot Line	OK ?	in H2O ?
Pre-test (-):	✓	4
Pre-test (+):	✓	4
Post-test (-):	✓	4
Post-test (+):	✓	4

Sample Train	(Pretest)	(Post test)
Leak Rate:	0.01	0.01
Vac:	-15	-15
If needed:	(Mid)	(Mid)
Leak Rate:		
Vac:		

Traverse Point	Clock Time	Elapsed Time	ΔP (in. H_2O)	Meter Conditions ΔH	Meter Conditions Meter Volume	Temperature (°F) Stack	Temperature (°F) Probe	Temperature (°F) Oven	Meter (°F) In	Meter (°F) Out	Imp Out (°F)	Vac (in. Hg)	202	K
A1	811	0	0.16	1.8	817.155	84	229	250	51	55	52	9	68	11.1
2	8:16	5	0.16	1.8	817.79	85	245	251	52	56	51	9	67	
3	8:21	10	0.17	1.9	821.48	85	245	260	51	57	52	9	68	
4	8:26	15	0.2	2.2	825.29	85	242	252	52	58	51	11.5	67	
5	8:31	20	0.17	1.9	829.46	85	241	250	52	64	51	13	67	
6	8:36	25	0.16	1.8	833.80	85	255	250	51	64	52	11	68	
7	8:41	30	0.15	1.7	837.75	85	254	251	52	64	52	11	68	
8	8:46	35	0.15	1.7	841.54	84	255	250	51	63	51	11	68	
9	8:51	40	0.15	1.7	845.25	84	257	250	51	64	51	11	68	
10	8:56	45	0.15	1.7	849.00	84	257	251	50	63	50	11.5	67	
11	9:01	50	0.15	1.7	852.87	84	257	251	50	63	50	11	67	
12	9:06	55	0.15	1.7	856.74	84	257	251	51	64	51	11	68	
~~B1~~ ~~12~~ SN JA	9:11	~~60~~	—	—	860.625	—	—	—	—	—	—	—	—	
~~1~~ B1	9:21	60	0.16	1.8	860.625	84	256	250	50	63	50	10.5	67	
~~3~~ 2	9:26	65	0.16	1.8	864.54	84	255	250	50	63	51	10.5	67	
~~4~~ 3	9:31	70	0.15	1.7	868.48	85	258	251	50	64	52	10.5	67	
~~5~~ 4	9:36	75	0.16	1.8	872.36	85	257	250	51	64	51	10	68	
~~6~~ 5	9:41	80	0.16	1.8	876.26	84	256	250	49	62	50	10.5	69	
~~7~~ 6	9:46	85	0.16	1.8	880.18	84	257	250	49	63	50	10.5	69	
~~8~~ 7	9:51	90	0.16	1.8	884.09	84	256	249	50	65	51	10.5	68	
~~9~~ 8	9:56	95	0.16	1.8	887.9	84	255	250	50	65	52	10.5	68	
~~10~~ 9	10:01	100	0.16	1.8	891.8	84	255	249	51	65	51	10.5	68	
~~11~~ 10	10:06	105	0.16	1.8	895.79	85	258	249	50	65	52	10.5	67	
12 11	10:11	110	0.16	1.8	899.77	85	259	250	51	65	52	10.5	67	
12 12 ~~SN JA~~	10:16	115	0.16	1.8	903.65	85	259	251	52	65	51	10.5	67	
	10:21	120			907.599									

SPECIALTY

Plant	Nemcor 16282	Date	1-12-16
Run Number	R3 East	Method No.	5/202
Sample Location	Press Vent East	Train No.	1
Setup Technician	SN	Cleanup Technician	SN

Back-Half Catch

	Impinger 1	Impinger 2	Impinger 3	Impinger 4	Impinger 5	Impinger 6	Impinger 7
Final Weights (grams)	508.4	628.4	742.9	912.9			
Initial Weight (grams)	508.4	628.4	739.1	881.6			
Net Gain (grams)	0.0	0.0	3.8	31.3			

Method 202 Purge Temp (F)	% Silica Gel Spent
0 mins	0
10 mins	
20 mins	8 cl.
30 mins	
40 mins	
50 mins	
60 mins	

Total Impinger Catch (grams) 35.1

Back Half Wash Solution(s) DI H_2O / Acetone / Hexane

Impinger Charge Solution(s) DI H_2O

Post-test Impinger solution appearance: Clear

Filter Identifications and Recoveries

	In-Stack Filter	Hot Box Filter	Method 202
Filter #	—	2-3603	—

Filter Notes: Brown spots on filter

Front Half Wash solution(s) Acetone

Sample Bottles

	Front Half			Back- Half			
	Container # 1	Container # 2	Container #	Container # 1	Container # 2	Container # 3	Container #
Description/ Contents	Filter	Acetone		DI H_2O	Acetone/ Hexane	Filter	
Sample ID	M5/202-C1-R3 East	M5/202-C2-R3 East		M5/202-CPM1-R3 East	M5/202-CPM2-R3 East	M5/202-CPM3-R3 East	
Final Wt	—	242.1		491.9	290.0	—	
Tare Wt	—	210.1		284.9	170.5	—	
Net Wash Wt	—	32.0		207.0	119.5	—	

VISIBLE EMISSION OBSERVATION FORM

Form #GSC-TM023-004
REV 2013-01, EFF 9/30/13

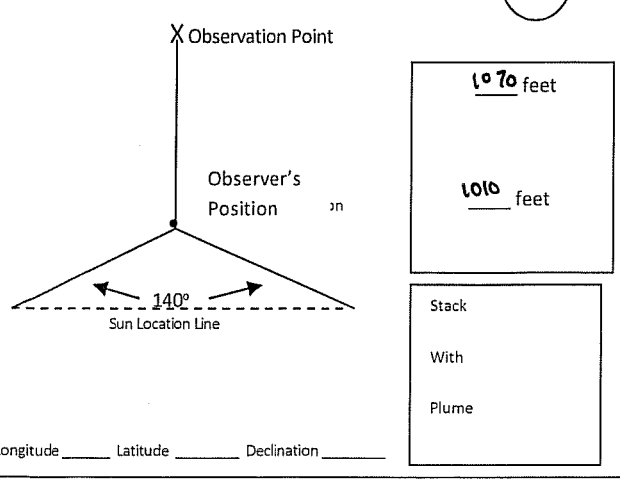
Method used (Circle One)
Method 9 ✓ 203A____ 203B____ Other _____

Company Name	Nevcor
Facility Name	White Swan
Street Address	3572 Wesley Rd
City	White Swan
State	WA
Zip	
Process	Press Vent
Unit #	East
Operating Mode	Normal
Control Equipment	N/A
Operating Mode	N/A
Describe Emission Point	Press vent
Height of Emiss. Pt.	Start 60 End 60
Height of Emiss. Pt. Rel. To Observer	Start 60 End 60
Distance to Emiss. Pt.	Start 400 End 400
Direction to Emiss. Pt. (Degrees)	Start 43° NE End 43° NE

Vertical Angle to Obs. Pt.	Start End
Direction to Obs. Pt. (Degrees)	Start End
Distance and Direction to Observation Point from Emission Point	Start End
Describe Emissions	Start None End None
Emissions Color	Start N/A End N/A
Water Droplet Plume	Attached ☐ Detached ☐ None ☒
Describe Plume Background	Start Sky/clouds End Sky/clouds
Background Color	Start White End White
Sky Conditions	Start Cloudy End Cloudy
Wind Speed	Start 0 End 0
Wind Direction	Start N/A End N/A
Ambient Temperature	Start 59 End 59
Wet Bulb Temp	47°
RH Percent	65%

Source Layout Sketch

Draw North Arrow
TN ☐ MN ☐



Longitude _____ Latitude _____ Declination _____

Form Number	Page
Continued on VEO Form Number	

Observation Date	Time Zone	Start Time	End Time
10/25/16	Pacific	15:03	15:21

Sec / Min	0	15	30	45	Comments
1	0	0	0	0	
2	0	0	0	0	
3	0	0	0	0	
4	0	0	0	0	
5	0	0	0	0	
6	0	0	0	0	
7	0	0	0	0	
8	0	0	0	0	
9	0	0	0	0	
10	0	0	0	0	
11	0	0	0	0	
12	0	0	0	0	
13	0	0	0	0	
14	0	0	0	0	
15	0	0	0	0	
16	0	0	0	0	
17	0	0	0	0	
18	0	0	0	0	
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					

Additional Information:

Observer's Name (Print)	Jacob Amerman
Observer's Signature	Jacob Amerman
Date	10/25/16
Organization	Golden Specialty
Certified By	Aeromet Engineering
Date	9/29/16

VISIBLE EMISSION OBSERVATION FORM

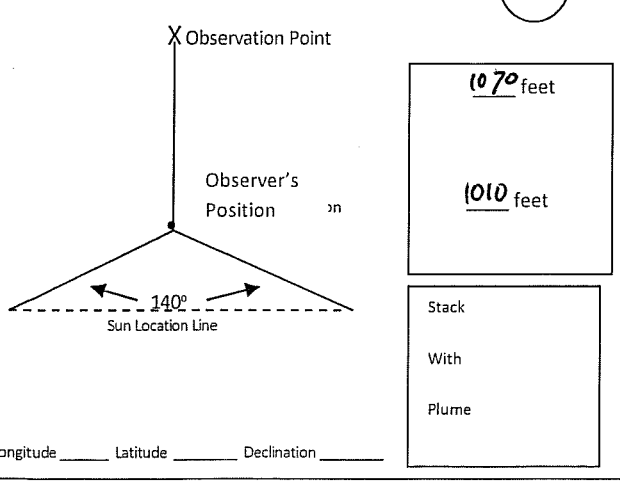
Form #GSC-TM023-004
REV 2013-01, EFF 9/30/13

Method used (Circle One)
Method 9 ✓ 203A____ 203B____ Other _____

Company Name	Nucor
Facility Name	White Swan
Street Address	3592 Wesley Rd
City	Whiteswan
State	WA
Zip	
Process	PressVent
Unit #	West
Operating Mode	Normal
Control Equipment	N/A
Operating Mode	N/A
Describe Emission Point	Press Vent
Height of Emiss. Pt. Start	60
Height of Emiss. Pt. End	60
Height of Emiss. Pt. Rel. To Observer Start	60
Height of Emiss. Pt. Rel. To Observer End	60
Distance to Emiss. Pt. Start	400'
Distance to Emiss. Pt. End	400'
Direction to Emiss. Pt. (Degrees) Start	43° NE
Direction to Emiss. Pt. (Degrees) End	43° NE
Vertical Angle to Obs. Pt. Start	
Vertical Angle to Obs. Pt. End	
Direction to Obs. Pt. (Degrees) Start	
Direction to Obs. Pt. (Degrees) End	
Distance and Direction to Observation Point from Emission Point Start	
Distance and Direction to Observation Point from Emission Point End	
Describe Emissions Start	None
Describe Emissions End	None
Emissions Color Start	N/A
Emissions Color End	N/A
Water Droplet Plume	Attached ☐ Detached ☐ None ☑
Describe Plume Background Start	Sky
Describe Plume Background End	Sky
Background Color Start	White
Background Color End	White
Sky Conditions Start	Cloudy
Sky Conditions End	Cloudy
Wind Speed Start	0
Wind Speed End	0
Wind Direction Start	N/A
Wind Direction End	N/A
Ambient Temperature Start	59
Ambient Temperature End	59
Wet Bulb Temp	47°
RH Percent	65%

Source Layout Sketch

Draw North Arrow
TN ☐ MN ☐



Longitude _____ Latitude _____ Declination _____

Form Number	Page
Continued on VEO Form Number	

Observation Date	Time Zone	Start Time	End Time
10/25/16	Pacific	15:03	15:21

Min \ Sec	0	15	30	45	Comments
1	0	0	0	0	
2	0	0	0	0	
3	0	0	0	0	
4	0	0	0	0	
5	0	0	0	0	
6	0	0	0	0	
7	0	0	0	0	
8	0	0	0	0	
9	0	0	0	0	
10	0	0	0	0	
11	0	0	0	0	
12	0	0	0	0	
13	0	0	0	0	
14	0	0	0	0	
15	0	0	0	0	
16	0	0	0	0	
17	0	0	0	0	
18	0	0	0	0	
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					

Additional Information:

Observer's Name (Print)	Jacob Amerman
Observer's Signature	Jacob Amerman
Date	10/25/16
Organization	Golden Specialty
Certified By	Aeromet Engineering
Date	9/29/16

VISIBLE EMISSION OBSERVATION FORM

Form #GSC-TM023-004
REV 2013-01, EFF 9/30/13

Method used (Circle One)
Method 9 ✓ 203A____ 203B____ Other _____

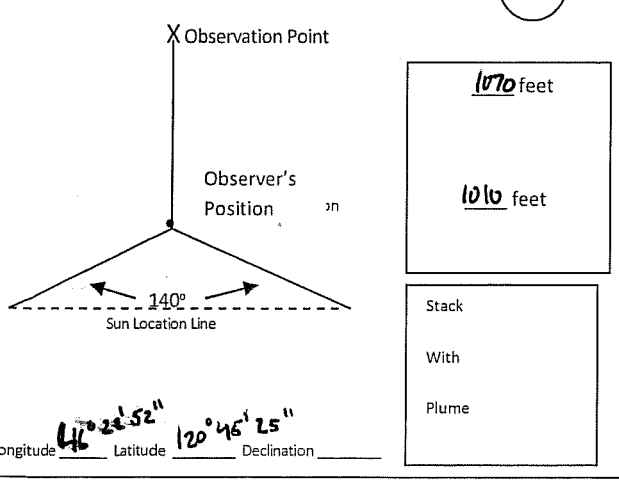
Company Name	Nevcor
Facility Name	White Swan
Street Address	3592 Wesley Rd
City	White Swan
State	WA
Zip	
Process	Press Vent
Unit #	East
Operating Mode	Normal
Control Equipment	N/A
Operating Mode	
Describe Emission Point	Press Vent
Height of Emiss. Pt. Start	60'
Height of Emiss. Pt. End	60'
Height of Emiss. Pt. Rel. To Observer Start	60'
Height of Emiss. Pt. Rel. To Observer End	60'
Distance to Emiss. Pt. Start	200'
Distance to Emiss. Pt. End	200'
Direction to Emiss. Pt. (Degrees) Start	325° NW
Direction to Emiss. Pt. (Degrees) End	325° NW

JA 10/25

Vertical Angle to Obs. Pt. Start	End
Direction to Obs. Pt. (Degrees) Start	~~325° NW~~ End
Distance and Direction to Observation Point from Emission Point Start	End
Describe Emissions Start	None
Describe Emissions End	None
Emissions Color Start	N/A
Emissions Color End	N/A
Water Droplet Plume	Attached ☐ Detached ☐ None ☒
Describe Plume Background Start	Sky
Describe Plume Background End	Sky
Background Color Start	Blue
Background Color End	Blue
Sky Conditions Start	Clear
Sky Conditions End	Clear
Wind Speed Start	0
Wind Speed End	0
Wind Direction Start	N/A
Wind Direction End	N/A
Ambient Temperature Start	53
Ambient Temperature End	53
Wet Bulb Temp	45
RH Percent	77

Source Layout Sketch

Draw North Arrow
TN ☐ MN ☐



Longitude 46°22'52" Latitude 120°45'25" Declination _____

Form Number						Page
Continued on VEO Form Number						

Observation Date	Time Zone	Start Time	End Time
10/25	Pacific	11:30	11:48

Sec / Min	0	15	30	45	Comments
1	0	0	0	0	
2	0	0	0	0	
3	0	0	0	0	
4	0	0	0	0	
5	0	0	0	0	
6	0	0	0	0	
7	0	0	0	0	
8	0	0	0	0	
9	0	0	0	0	
10	0	0	0	0	
11	0	0	0	0	
12	0	0	0	0	
13	0	0	0	0	
14	0	0	0	0	
15	0	0	0	0	
16	0	0	0	0	
17	0	0	0	0	
18	0	0	0	0	
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					

Additional Information:

Observer's Name (Print)	Jacob Amerman
Observer's Signature	Jacob Amerman
Date	10/25/16
Organization	Golden Specialty
Certified By	Aeromet Engineering
Date	9/20/16

GOLDEN SPECIALTY

USEPA Method 5/202 Field Data Sheet

Test Date: 10/25/16
Project Number: 160242
Location: Neucor
Process: Press Vent - West
Source Name: Press Vent L-West
Operators: JH/SN/JA/AK
Run Number: 1 West

Filter Number: 2-3586
Nozzle ID: 0200-2
Nozzle Dia. (in.): 0.3235
Meter Box ID: CCI-1
ΔH@: 1.589
Meter Y: 1.010
P_{bar} (in. H_g): 29.04
P_{static} (in. H_2O): 0.1

Train ID: 1
Hot Box ID: —
Pitot Coeff: 0.84
Probe/Pitot ID: MM-5-1
Stack TC ID: TC-MM-5-
Probe TC ID: TC-MM-5-1
Effective Length: 5ft
Liner (SS, glass): glass
Stack Diam/LxW: 46 inch

Leak Checks

Pitot Line	OK ?	in H2O ?
Pre-test (-):	✓	4
Pre-test (+):	✓	4
Post-test (-):	✓	4
Post-test (+):	✓	4

Sample Train	(Pretest)	(Post test)
Leak Rate:	0.015	0.015
Vac:	15"	10"
If needed:	(Mid)	(Mid)
Leak Rate:		
Vac:		

Traverse Point	Clock Time	Elapsed Time	ΔP (in. H_2O)	Meter Conditions ΔH	Meter Volume	Temperature (°F) Stack	Probe	Oven	Meter (°F) In	Out	Imp Out (°F)	Vac (in. Hg)	202 Filter	K'
A 1	10:36	0	0.24	2.4	603.510	83	230	273	66	62	60	6.5	65	10.2
2	10:41	5	0.24	2.4	607.75	85	239	275	66	62	60	7	65	10.2
3	10:46	10	0.24	2.4	612.11	85	269	276 10/25 JA	68	63	60	7.5	65	10.2
4	10:51	15	0.24	2.4	616.52	86	275	~~259~~ 251	68	64	60	7.5	67	10.2
5	10:52 / 10:59	20	0.24	2.4	618.104 / 621.01	87	268	259	69	65	60	7	67	10.2
6	11:04	25	0.24	2.4	625.42	87	266	257	72	67	60	7	67	10.2
7	11:09	30	0.23	2.5	629.83	87	265	258	73	66	60	7	67	10.2
8	11:14	35	0.23	2.4	634.29	87	266	260	74	69	60	7	67	10.2
9	11:19	40	0.23	2.4	638.74	84	265	259	74	69	57	7	67	10.2
10	11:24	45	0.23	2.4	643.20	85	267	258	74	70	58	7	62	10.2
11	11:29	50	0.23	2.4	647.7	87	266	258	75	70	57	7	62	10.2
12	11:34	55	0.23	2.4	652.35	88	264	259	75	70	57	7	63	10.2
B 1	11:39 / 11:43	1:00	0.23	2.4	657.005	87	262	258	75	71	56	8	63	10.2
2	11:48	1:05	0.24	2.4	661.7	86	263	258	76	72	64	8	64	10.2
3	11:53	1:10	0.24	2.4	666.35	86	264	260	76	72	64	8	65	10.2
4	11:58	1:15	0.24	2.4	671.09	86	265	261	76	72	64	8	65	10.2
5	12:03	1:20	0.23	2.4	675.79	85	264	261	76	73	62	8	65	10.2
6	12:08	1:25	0.23	2.4	680.53	88	268	262	75	73	62	8	65	10.2
7	12:13	1:30	0.24	2.4	685.14	88	264	261	76	72	60	8	65	10.2
8	12:18	1:35	0.23	2.4	689.74	87	264	262	75	72	60	8	64	10.2
9	12:23	1:40	0.24	2.4	694.32	86	265	261	75	72	62	9	65	10.2
10	12:28	1:45	0.24	2.4	699.09	86	265	261	75	72	62	8	65	10.2
11	12:33	1:50	0.24	2.4	703.66	87	264	261	77	72	62	8	64	10.2
12	12:38	1:55	0.22	2.3	708.22	87	~~279~~ 267	261	78	73	62	8	66	10.2
	12:43	2:00			712.730		JA 10/25							

SPECIALTY

Plant	Mercer 160282	Date	10/25/16
Run Number	R1-West	Method No.	5/202
Sample Location	Press Vent - West	Train No.	2
Setup Technician	SN	Cleanup Technician	SN

Back-Half Catch

	Impinger 1	Impinger 2	Impinger 3	Impinger 4	Impinger 5	Impinger 6	Impinger 7
Final Weights (grams)	489.2	524.8	795.8	858.3			
Initial Weight (grams)	489.2	524.8	795.4	820.7			
Net Gain (grams)	0.0	0.0	0.4	37.6			

Method 202 Purge Temp (F)	% Silica Gel Spent
0 mins	0
10 mins	
20 mins	8c 1.
30 mins	
40 mins	
50 mins	
60 mins	

Total Impinger Catch (grams) 38.0

Back Half Wash Solution(s) H_2O, Acetone, Hexane

Impinger Charge Solution(s) H_2O

Post-test Impinger solution appearance: Clear

Filter Identifications and Recoveries

	In-Stack Filter	Hot Box Filter	Method 202
Filter #		2-5386	

Filter Notes: Layer of lush ~~of~~ SN 10/25 on filter

Front Half Wash solution(s) Acetone

Sample Bottles

	Front Half			Back- Half			
	Container # 1	Container # 2	Container #	Container # 1	Container # 2	Container # 3	Container #
Description/ Contents	Filter	Acetone		DI H_2O	Organic Rinse	CPM filter.	
Sample ID	M5/202 C1-R1West	M5/202 C2-R1West		M5/202 -CPM 1-R1West	M5/202 -CPM 2 - R1West	M5/202 -CPM 3 -R1West	
Final Wt	—	290.3		437.8	234.3	—	
Tare Wt	—	210.6		288.3	171.2	—	
Net Wash Wt	—	79.7		149.5	63.1	—	

GOLDEN SPECIALTY

USEPA Method 5/202 Field Data Sheet

Test Date:	10/25/16	Filter Number:	2-3604
Project Number:	160282	Nozzle ID:	glass-2
Location:	Nevcor	Nozzle Dia. (in.):	0.3235
Process:	Press Vent	Meter Box ID:	CCI-1
Source Name:	West	ΔH@:	1.589
Operators:	JH/SN/JA/AK	Meter Y:	1.010
		P_{bar} (in. H_g):	29.04
		P_{static} (in. H_2O):	0.1
Run Number:	2 West		

Train ID	3
Hot Box ID	—
Pitot Coeff:	0.84
Probe/Pitot ID:	MW-S-1
Stack TC ID:	TC-MW-S-1
Probe TC ID:	TC-MW-S-1
Effective Length:	5ft
Liner (SS, glass):	glass
Stack Diam/LxW	46"

Leak Checks

Pitot Line	OK ?	in H2O ?
Pre-test (-):	✓	4
Pre-test (+):	✓	4
Post-test (-):	✓	4
Post-test (+):	✓	4

Sample Train	(Pretest)	(Post test)
Leak Rate:	0.015	0.015
Vac:	-15	10"
If needed:	(Mid)	(Mid)
Leak Rate:		
Vac:		

Traverse Point	Clock Time	Elapsed Time	ΔP (in. H_2O)	Meter Conditions ΔH	Meter Conditions Meter Volume	Temperature (°F) Stack	Temperature (°F) Probe	Temperature (°F) Oven	Meter (°F) In	Meter (°F) Out	Imp Out (°F)	Vac (in. Hg)	202 Filter	K'
A1	~~13:50~~ 14:30	0	0.23	2.3	714.634	86	265	261	69	67	63	7	65	10.2
2	14:35	5	0.23	2.3	719.58	90	262	260	70	67	64	7	65	10.2
3	14:40	10	0.22	2.2	724.09	90	262	259	70	67	64	7	67	10.2
4	14:45	15	0.23	2.3	728.52	90	266	259	70	67	64	7	67	10.2
5	14:50	20	0.23	2.3	733.03	91	264	253	70	68	64	7	68	10.2
6	14:55	25	0.23	2.3	737.56	88	262	257	70	68	65	7	68	10.2
7	15:00	30	0.23	2.3	742.09	88	263	266	70	68	65	7	70	10.2
8	15:05	35	0.23	2.3	746.62	88	264	259	71	68	66	7	70	10.2
9	15:10	40	0.22	2.2	751.13	89	266	258	72	68	66	7	70	10.2
10	15:15	45	0.22	2.2	755.6	90	260	254	72	69	65	7	69	
11	15:20	50	0.22	2.2	759.9	88	250	257	72	69	66	7	69	
12	15:25	55	0.22	2.2	764.3	91	254	258	72	69	65	7	70	
B1	1530/1540	6:00	0.21	2.1	768.590	91	255	256	74	69	64	7	70	
2	1823	1:06	0.22	2.2	772.8	87	248	257	56	57	51	7	69	
3	18:25	1:10	0.22	2.2	777.1	87	245	256	56	56	49	7	70	
4	18:33	1:15	0.23	2.3	781.4	87	249	256	59	56	52	7	70	
5	18:38	1:20	0.23	2.3	785.7	86	250	256	59	56	57	7	71	
6	18:43	1:25	0.24	2.4	790.15	86	251	256	60	56	61	7	71	
7	18:48	1:30	0.24	2.4	794.54	85	252	256	61	57	61	7	72	
8	18:53	1:35	0.24	2.4	798.98	87	251	256	61	57	61	7	72	
9	18:58	1:40	0.24	2.4	803.42	85	251	256	62	57	63	7	73	
10	19:03	1:45	0.24	2.4	807.87	85	247	257	62	57	63	7	74	
11	19:08	1:50	0.23	2.3	812.36	86	249	257	63	58	65	7	75	
12	19:13	1:55	0.23	2.3	816.73	85	252	257	64	58	65	7	75	
	19:18	2:00			821.182			END RUN						

SPECIALTY

Plant	Nucor 16.282	Date	1/25/16
Run Number	R2 West	Method No.	5/202
Sample Location	Press Vent West	Train No.	2
Setup Technician	SN	Cleanup Technician	SN

Back-Half Catch

	Impinger 1	Impinger 2	Impinger 3	Impinger 4	Impinger 5	Impinger 6	Impinger 7
Final Weights (grams)	476.5	541.2	755.6	958.7			
Initial Weight (grams)	476.5	541.2	755.9	924.7			
Net Gain (grams)	0.0	0.0	-0.3	34.0			

Method 202 Purge Temp (F)	% Silica Gel Spent
0 mins	0
10 mins	
20 mins	70%
30 mins	
40 mins	
50 mins	
60 mins	

Total Impinger Catch (grams): 33.7

Back Half Wash Solution(s): H_2O, Acetone, Hexane

Impinger Charge Solution(s): H_2O

Post-test Impinger solution appearance: Clear

Filter Identifications and Recoveries

	In-Stack Filter	Hot Box Filter	Method 202
Filter #	—	2-3604	

Filter Notes: Layer of husk on filter

Front Half Wash solution(s): Acetone

Sample Bottles

	Front Half			Back- Half			
	Container # 1	Container # 2	Container #	Container # 1	Container # 2	Container # 3	Container #
Description/ Contents	Filter	Acetone		DI H_2O	Acetone / Hexane	Filter	
Sample ID	M5/202-C1-R2 West	M5/202-C2-R2 West		M5/202-CPM1-R2 West	M5/202-CPM2-R2 West	M5/202-CPM3-R2 West	
Final Wt	—	264.5		463.7	269.9	—	
Tare Wt	—	207.8		280.1	169.3	—	
Net Wash Wt	—	56.7		183.6	100.6	—	

GOLDEN SPECIALTY

USEPA Method 5/202 Field Data Sheet

Page ___ of ___

Test Date:	10/26/16	Filter Number:	23599
Project Number:	160282	Nozzle ID:	glass-2
Location:	Nucor	Nozzle Dia. (in.):	0.3235
Process:	Press Vent	Meter Box ID:	CCI-1
Source Name:	West	ΔH@:	1.569
Operators:	JH/SN/JA/AK	Meter Y:	1.010
		P_{bar} (in. H_g):	29.38
		P_{static} (in. H_2O):	0.1
Run Number:	3 West		

Train ID	1
Hot Box ID	
Pitot Coeff:	0.84
Probe/Pitot ID:	NW-54
Stack TC ID:	TC MW 5-1
Probe TC ID:	TC MW 5-1
Effective Length:	50'
Liner (SS, glass):	glass
Stack Diam/LxW	4 fin

Leak Checks

Pitot Line	OK ?	in H2O ?
Pre-test (-):	✓	4
Pre-test (+):	✓	4
Post-test (-):	✓	4
Post-test (+):	✓	4

Sample Train	(Pretest)	(Post test)
Leak Rate:	0.015	0.015
Vac:	-15	-8
If needed:	~~(Mid)~~	~~(Mid)~~
Leak Rate:		
Vac:		

Traverse Point	Clock Time	Elapsed Time	ΔP (in. H_2O)	Meter Conditions ΔH	Meter Volume	Temperature (°F) Stack	Probe	Oven	Meter (°F) In	Out	Imp Out (°F)	Vac (in. Hg)	202 Filter	K'
A1	8:11	0	0.23	2.3	823.326	85	251	255	55	51	50	6.5	66	10.2
2	8:16	5	0.23	2.3	827.68	85	244	253	57	51	50	6.5	66	10.2
3	8:21	10	0.23	2.3	832.07	85	245	254	57	52	54	7	66	10.2
4	8:26	15	0.23	2.3	836.48	85	243	255	54	53	54	7	67	10.2
5	8:31	20	0.23	2.3	840.8	85	246	254	59	53	56	7	67	
6	8:36	25	0.22	2.2	845.2	84	245	255	59	53	56	7	68	
7	8:41	30	0.23	2.3	849.6	84	243	255	59	53	56	7	68	
8	8:46	35	0.23	2.3	854.0	84	245	253	60	54	55	7	68	
9	8:51	40	0.23	2.3	858.4	84	243	255	60	55	55	7	68	
10	8:56	45	0.23	2.3	862.7	84	244	255	60	55	55	7	68	
11	9:01	50	0.23	2.3	867.1	84	244	255	61	55	54	7	68	
12	9:06	55	0.23	2.3	871.4	84	245	254	61	55	54	7	68	
B1	~~9:11~~ 9:21	1:00	0.22	2.2	875.900	84	245	255	62	55	54	7	68	
2	9:26	1:05	0.22	2.2	880.10	83	248	256	62	56	54	7	69	
3	9:31	1:10	0.22	2.2	884.39	82	251	256	62	56	55	7	69	
4	9:36	1:15	0.23	2.3	888.69	83	252	256	62	56	56	7	69	
5	9:41	1:20	0.22	2.2	892.99	83	253	256	62	56	58	7	69	
6	9:46	1:25	0.22	2.2	897.28	84	251	255	62	56	58	7	69	
7	9:51	1:30	0.22	2.2	901.57	85	248	256	62	56	59	7	70	
8	9:56	1:35	0.22	2.2	905.87	84	246	256	63	56	60	7	70	
9	10:01	1:40	0.22	2.2	910.17	85	248	255	63	57	60	7	70	
10	10:06	1:45	0.22	2.2	914.45	84	249	254	63	57	61	7	70	
11	10:11	1:50	0.22	2.2	918.74	84	250	255	63	57	61	7	70	
12	10:16	1:55	0.22	2.2	923.04	85	250	255	63	57	61	7	70	
	10:21	2:00			927.341									

SPECIALTY

Plant	Nucor / 60282	Date	10/28/16
Run Number	R3 West	Method No.	5/202
Sample Location	Press Vent - West	Train No.	2
Setup Technician	SN	Cleanup Technician	SN

Back-Half Catch

	Impinger 1	Impinger 2	Impinger 3	Impinger 4	Impinger 5	Impinger 6	Impinger 7
Final Weights (grams)	491.4	526.4	807.0	884.8			
Initial Weight (grams)	491.4	526.4	794.8	851.8			
Net Gain (grams)	0.0	0.0	12.2	33.0			

Method 202 Purge Temp (F)	% Silica Gel Spent
0 mins	0%
10 mins	
20 mins	70%
30 mins	
40 mins	
50 mins	
60 mins	

Total Impinger Catch (grams): 45.2

Back Half Wash Solution(s): DI H_2O / Acetone / Hexane

Impinger Charge Solution(s): DI H_2O

Post-test Impinger solution appearance: Clear

Filter Identifications and Recoveries

	In-Stack Filter	Hot Box Filter	Method 202
Filter #		2-3599	

Filter Notes: Layer of lush off on filter. SH 12/5

Front Half Wash solution(s): Acetone

Sample Bottles

	Front Half			Back- Half			
	Container # 1	Container # 2	Container #	Container # 1	Container # 2	Container # 3	Container #
Description/ Contents	Filter	Acetone		DI H_2O	Acetone / Hexane	Filter	
Sample ID	M5/202 -C1-R3 West	M5/202 -C1-R3 West		M5/202-CPM 1 -R3 West	M5/202-CPM2 - R3 West	M5/202-CPM 3- R3 West	
Final Wt	—	262.2		462.7	280.9	—	
Tare Wt	—	211.2		278.4	170.8	—	
Net Wash Wt	—	50.0		184.3	110.1	—	

VISIBLE EMISSION OBSERVATION FORM

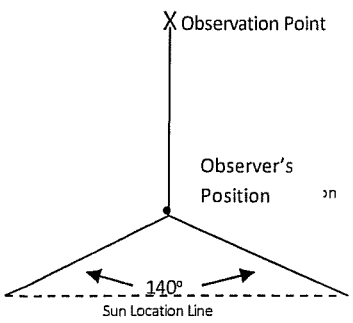
Form #GSC-TM023-004
REV 2013-01, EFF 9/30/13

Method used (Circle One)
Method 9 ✓ 203A____ 203B____ Other_____

Company Name	Neveor
Facility Name	White Swan
Street Address	3592 Wesley Rd
City	White Swan
State	WA
Zip	
Process	Press Vent
Unit #	West
Operating Mode	Normal
Control Equipment	N/A
Operating Mode	N/A
Describe Emission Point	Press Vent
Height of Emiss. Pt. Start	60'
Height of Emiss. Pt. End	60'
Height of Emiss. Pt. Rel. To Observer Start	60'
Height of Emiss. Pt. Rel. To Observer End	60'
Distance to Emiss. Pt. Start	200'
Distance to Emiss. Pt. End	200'
Direction to Emiss. Pt. (Degrees) Start	325° NW
Direction to Emiss. Pt. (Degrees) End	325° NW
Vertical Angle to Obs. Pt. Start	
Vertical Angle to Obs. Pt. End	
Direction to Obs. Pt. (Degrees) Start	
Direction to Obs. Pt. (Degrees) End	
Distance and Direction to Observation Point from Emission Point Start	
Distance and Direction to Observation Point from Emission Point End	
Describe Emissions Start	None
Describe Emissions End	None
Emissions Color Start	N/A
Emissions Color End	N/A
Water Droplet Plume	Attached ☐ Detached ☐ None ☒
Describe Plume Background Start	Sky
Describe Plume Background End	Sky
Background Color Start	Blue
Background Color End	Blue
Sky Conditions Start	Clear
Sky Conditions End	Clear
Wind Speed Start	0
Wind Speed End	0
Wind Direction Start	N/A
Wind Direction End	N/A
Ambient Temperature Start	53
Ambient Temperature End	53
Wet Bulb Temp	45
RH Percent	77

Source Layout Sketch

Draw North Arrow
TN ☐ MN ☐



1070' feet

1010 feet

Stack With Plume

Longitude _____ Latitude _____ Declination _____

Form Number	Page
Continued on VEO Form Number	

Observation Date	Time Zone	Start Time	End Time
		11:30	11:48

Sec / Min	0	15	30	45	Comments
1	0	0	0	0	
2	0	0	0	0	
3	0	0	0	0	
4	0	0	0	0	
5	0	0	0	0	
6	0	0	0	0	
7	0	0	0	0	
8	0	0	0	0	
9	0	0	0	0	
10	0	0	0	0	
11	0	0	0	0	
12	0	0	0	0	
13	0	0	0	0	
14	0	0	0	0	
15	0	0	0	0	
16	0	0	0	0	
17	0	0	0	0	
18	0	0	0	0	
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					

Additional Information:

Observer's Name (Print)	Jacob Amermann
Observer's Signature	[signature]
Date	10/25/16
Organization	Golden Specialty
Certified By	Aeromet Engineering
Date	9/29/16

VISIBLE EMISSION OBSERVATION FORM

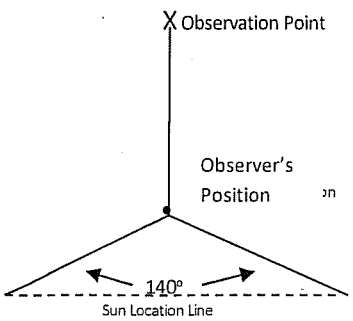
Form #GSC-TM023-004
REV 2013-01, EFF 9/30/13

Method used (Circle One)
Method 9____ 203A____ 203B____ Other _____

Company Name	Nevcor
Facility Name	White Swan
Street Address	3592 Wesley Rd
City	White Swan
State	WA
Zip	
Process	Press Vent
Unit #	East
Operating Mode	normal
Control Equipment	N/A
Operating Mode	N/A
Describe Emission Point	Press Vent
Height of Emiss. Pt. Start	60
Height of Emiss. Pt. End	60
Height of Emiss. Pt. Rel. To Observer Start	60
Height of Emiss. Pt. Rel. To Observer End	60
Distance to Emiss. Pt. Start	200
Distance to Emiss. Pt. End	200
Direction to Emiss. Pt. (Degrees) Start	325° NW
Direction to Emiss. Pt. (Degrees) End	325° NW
Vertical Angle to Obs. Pt. Start	
Vertical Angle to Obs. Pt. End	
Direction to Obs. Pt. (Degrees) Start	
Direction to Obs. Pt. (Degrees) End	
Distance and Direction to Observation Point from Emission Point Start	
Distance and Direction to Observation Point from Emission Point End	
Describe Emissions Start	None
Describe Emissions End	None
Emissions Color Start	N/A
Emissions Color End	N/A
Water Droplet Plume	Attached ☐ Detached ☐ None ☑
Describe Plume Background Start	Clouds
Describe Plume Background End	Clouds
Background Color Start	gray
Background Color End	gray
Sky Conditions Start	Raining
Sky Conditions End	Raining
Wind Speed Start	0
Wind Speed End	0
Wind Direction Start	N/A
Wind Direction End	N/A
Ambient Temperature Start	49
Ambient Temperature End	49
Wet Bulb Temp	48
RH Percent	96%

Source Layout Sketch

Draw North Arrow
TN ☐ MN ☐



1070 feet

1010 feet

Stack With Plume

Longitude _____ Latitude _____ Declination _____

Form Number						Page
Continued on VEO Form Number						

Observation Date	Time Zone	Start Time	End Time
10/26/16	Pacific	8:36	8:54

Sec / Min	0	15	30	45	Comments
1	0	0	0	0	
2	0	0	0	0	
3	0	0	0	0	
4	0	0	0	0	
5	0	0	0	0	
6	0	0	0	0	
7	0	0	0	0	
8	0	0	0	0	
9	0	0	0	0	
10	0	0	0	0	
11	0	0	0	0	
12	0	0	0	0	
13	0	0	0	0	
14	0	0	0	0	
15	0	0	0	0	
16	0	0	0	0	
17	0	0	0	0	
18	0	0	0	0	
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					

Additional Information:

Observer's Name (Print)	Jacob Amerman
Observer's Signature	[signature]
Date	10/26/16
Organization	Golden Specialty
Certified By	Aeromet Engineering
Date	9/22/16

VISIBLE EMISSION OBSERVATION FORM

Form #GSC-TM023-004
REV 2013-01, EFF 9/30/13

Method used (Circle One)
Method 9 ✓ 203A____ 203B____ Other _____

Company Name	Nevcor
Facility Name	White Swan
Street Address	3592 Wesley Rd
City	White Swan
State	WA
Zip	
Process	Press Vent
Unit #	west
Operating Mode	Normal
Control Equipment	N/A
Operating Mode	N/A
Describe Emission Point	Press Vent
Height of Emiss. Pt. Start	60
Height of Emiss. Pt. End	60
Height of Emiss. Pt. Rel. To Observer Start	60
Height of Emiss. Pt. Rel. To Observer End	60
Distance to Emiss. Pt. Start	200
Distance to Emiss. Pt. End	200
Direction to Emiss. Pt. (Degrees) Start	325° NW
Direction to Emiss. Pt. (Degrees) End	325° NW

Vertical Angle to Obs. Pt. Start	
Vertical Angle to Obs. Pt. End	
Direction to Obs. Pt. (Degrees) Start	
Direction to Obs. Pt. (Degrees) End	
Distance and Direction to Observation Point from Emission Point Start	
Distance and Direction to Observation Point from Emission Point End	
Describe Emissions Start	None
Describe Emissions End	None
Emissions Color Start	N/A
Emissions Color End	N/A
Water Droplet Plume	Attached ☐ Detached ☐ None ☑
Describe Plume Background Start	Sky/clouds
Describe Plume Background End	Sky/clouds
Background Color Start	gray
Background Color End	gray
Sky Conditions Start	Cloudy/raining
Sky Conditions End	cloudy/Raining
Wind Speed Start	0
Wind Speed End	0
Wind Direction Start	N/A
Wind Direction End	N/A
Ambient Temperature Start	49
Ambient Temperature End	49
Wet Bulb Temp	49
RH Percent	96%

Source Layout Sketch

Draw North Arrow
TN ☐ MN ☐

X Observation Point

Observer's Position

140°
Sun Location Line

1070 feet

1010 feet

Stack

With

Plume

Longitude _____ Latitude _____ Declination _____

Form Number						Page					
Continued on VEO Form Number											

Observation Date	Time Zone	Start Time	End Time
10/26/16	Pacific	8:36	8:54

Sec / Min	0	15	30	45	Comments
1	0	0	0	0	
2	0	0	0	0	
3	0	0	0	0	
4	0	0	0	0	
5	0	0	0	0	
6	0	0	0	0	
7	0	0	0	0	
8	0	0	0	0	
9	0	0	0	0	
10	0	0	0	0	
11	0	0	0	0	
12	0	0	0	0	
13	0	0	0	0	
14	0	0	0	0	
15	0	0	0	0	
16	0	0	0	0	
17	0	0	0	0	
18	0	0	0	0	
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					

Additional Information:

Observer's Name (Print)	Jacob Amerman
Observer's Signature	[signature]
Date	10/26/16
Organization	Golden Specialty
Certified By	Aeromet Engineering
Date	~~10/26/16~~ 9/29/16 JA 10/26

FIELD DATA SHEET 2

FORM# GSC-RM002-00
REV 2015-01, EFF 3/19/1

Flows for NCASI 99.02

Velocity Traverse

Client Nexcor

Date 10/26/16

Facility White Swan, WA

Personnel/Signature

Test Location Press Vent - West

R1 - 12:35-12:45 R2-15:17-15:25

Note: Ensure that pitot tube is aligned parallel to the stack or duct axis.

Pitot Tube ID#	MM-5-1	
Pitot Tube Coefficient	0.84	
Barometric Pressure (in. Hg)	29.38	
Static Pressure (in. H_2O)	0.1	
Test Location Elevation Δ From Barom. (ft)	75	
Cyclonic Flow Checked? (Y/N)		
Pre-test Leak Check:	pos	neg
ΔP (in. H_2O)	4	4
Stable for 15 seconds? (yes / no)		
Post-test Leak Check:	pos	neg
ΔP (in. H_2O)	4	4
Stable for 15 seconds? (yes / no)		
Post-Test Checks		
Pitot damaged? (yes / no)		
Flow Measurement Device ID:	CCI-1	
Thermocouple Verification		
Reference thermometer ID:		
Reference thermometer reading:	°F	
Thermocouple reading:	°F	
Difference (must be +/- 2 °F):	°F	

Comments

Start Time:			Finish Time:		
Point #	ΔP (in. H_2O)	Temp °F	Point #	ΔP (in. H_2O)	Temp °F
A-1	0.23	85	A-1	0.22	85
A-2	0.23	85	A-2	0.22	85
A-3	0.24	84	A-3	0.22	85
A-4	0.23	84	A-4	0.23	85
A-5	0.23	83	A-5	0.23	85
A-6	0.22	83	A-6	0.23	83
A-7	0.23	83	A-7	0.23	84
A-8	0.23	82	A-8	0.22	84
A-9	0.24	83	A-9	0.23	84
A-10	0.23	83	A-10	0.23	84
A-11	0.23	83	A-11	0.22	84
A-12	0.24	83	A-12	0.23	84
B-1	0.24	83	B-1	0.23	83
B-2	0.24	84	B-2	0.23	83
B-3	0.23	84	B-3	0.23	83
B-4	0.22	84	B-4	0.23	83
B-5	0.22	84	B-5	0.23	83
B-6	0.24	84	B-6	0.23	83
B-7	0.23	84	B-7	0.23	83
B-8	0.23	84	B-8	0.22	83
B-9	0.23	83	B-9	0.22	83
B-10	0.22	82	B-10	0.22	84
B-11	0.22	83	B-11	0.23	84
B-12	0.22	82	B-12	0.23	85
Average:					

GOLDEN SPECIALTY

FIELD DATA SHEET 2

Flow for MCAS I 99.02

FORM# GSC-RM002-00
REV 2015-01, EFF 3/19/1

Velocity Traverse

Client Neucor

Date 1-26/16

Facility White Swan, WA

Personnel/Signature

Test Location Press Vent - West

R3 - 16:30 - 16:39

Note: Ensure that pitot tube is aligned parallel to the stack or duct axis.

Pitot Tube ID#	MW-5-1	
Pitot Tube Coefficient	0.84	
Barometric Pressure (in. Hg)	29.38	
Static Pressure (in. H_2O)	0.1	
Test Location Elevation Δ From Barom. (ft)	75	
Cyclonic Flow Checked? (Y/N)		
Pre-test Leak Check:	pos	neg
ΔP (in. H_2O)	4.5	4
Stable for 15 seconds? (yes / no)		
Post-test Leak Check:	pos	neg
ΔP (in. H_2O)	4.5	4.5
Stable for 15 seconds? (yes / no)		

Post-Test Checks

Pitot damaged? (yes / no)

Flow Measurement Device ID: CCI-1

Thermocouple Verification

Reference thermometer ID:

Reference thermometer reading: °F

Thermocouple reading: °F

Difference (must be +/- 2 °F): °F

Comments

Start Time: Finish Time:

Point #	ΔP (in. H_2O)	Temp °F	Point #	ΔP (in. H_2O)	Temp °F
A-1	0.22	83			
A-2	0.22	85			
A-3	0.23	86			
A-4	0.22	86			
A-5	0.23	86			
A-6	0.23	86			
A-7	0.23	87			
A-8	0.23	88			
A-9	0.23	89			
A-10	0.22	88			
A-11	0.22	89			
A-12	0.21	88			
B-1	0.22	87			
B-2	0.23	86			
B-3	0.24	85			
B-4	0.24	86			
B-5	0.24	87			
B-6	0.24	87			
B-7	0.24	87			
B-8	0.23	87			
B-9	0.23	87			
B-10	0.23	87			
B-11	0.23	87			
B-12	0.22	87			
Average:					

GOLDEN SPECIALTY

GOLDEN SPECIALTY
3855 South 500 West, Suite A
Salt Lake City, Utah 84115
801 269 0550

SV 10/20/16

Method ~~30B~~ Sampling Train

MCMS99.02

SV 10/20/16

Date 10/26/16	Operators JH ~~SVAA~~	Meter Box Number ~~937~~	VOST-3
Plant Name Neucor			
Unit/Location White Swan West		Meter Box Gamma ~~1.0000~~ SV 10/20/16	0.9658
Operating Load —	Run # 1 West	Pretest Leak Check	0.00 at -15
Barometric Pressure (Stack Elevation) 29.38		Posttest Leak Check	0.00 at -3

Tube Number_____ Tube Number_____

Traverse Point Number	Clock Time	Elapsed Time (minutes)	Gas Meter Reading (Liters)	Rotometer Reading (LPM)	Vacuum (" of Hg)	Temperatures Stack F	Meter In F	Meter Out F	Probe F	Condenser F
	12:25	0	0	0.4	~~0.4~~ 0 JH 10/26	—		53	25°	25
	12:35	10	4.010	0.4	0	—		53	25°	25°
	12:45	20	7.992	0.4	0	—		54	25°	25°
	12:55	30	11.988	0.4	0	—		55	25°	25°
	1:05 pm	40	15.980	0.4	0	—		56	25°	25°
	1:15 pm	50	20.050	0.4	0	—		56	25°	25°
	1:25 pm	60	24.030	~~0.4~~	~~0~~	—		~~56~~	~~25°~~	~~25°~~ SV 12/1/16

Fulton ~~Condenser~~ SV 10/26

Sample rate for VOST = 1 liter per minute, Sample rate for SLO-VOST = 0.5 liters per minute.
Maximum sample volume = 20 liters
Leak rate < 0.02 liter per minute (VOST) and < 0.01 liter per minute (SLO-VOST)
Probe temperature > or = 266 F
Condenser temp < or = 68 F

GOLDEN SPECIALTY
3855 South 500 West, Suite A
Salt Lake City, Utah 84115
801 269 0550

NCASI 99.02

Method ~~30B~~ Sampling Train

SN 1-1-20/16

SN 1-1-20/16

Date 10/26/16	Operators JH	Meter Box Number ~~937~~ VOST-3	
Plant Name Neucor			
Unit/Location White Swan West Press Vent		Meter Box Gamma 0.9658	
Operating Load	Run # 2 West	Pretest Leak Check 0.0000 @ 5	
Barometric Pressure (Stack Elevation) 29.38		Posttest Leak Check 0.00 @ -5	

Tube Number_____ **Tube Number**_____

Traverse Point Number	Clock Time	Elapsed Time (minutes)	Gas Meter Reading (Liters)	Rotometer Reading (LPM)	Vacuum (" of Hg)	Temperatures Stack F	Meter In F	Meter Out F	Probe F	~~Condenser~~ Filter F
	14:30 (JH 10/26)	0	0	0.4	0	—		57	250	250
	14:40	10	4.039	0.4	0	—		58	250	250
	~~14:50~~ 1507	20	7.978	0.4	0	—		61	250	250
	1517	30	12.003	0.4	0	—		62	250	250
	1527	40	16.021	0.4	0	—		63	250	250
	1537	50	20.005	0.4	0	—		63	250	250
	1547	60	23.979	0.4	0	—		~~64~~	—	—

Sample rate for VOST = 1 liter per minute, Sample rate for SLO-VOST = 0.5 liters per minute.
Maximum sample volume = 20 liters
Leak rate < 0.02 liter per minute (VOST) and < 0.01 liter per minute (SLO-VOST)
Probe temperature > or = 266 F
Condenser temp < or = 68 F

GOLDEN SPECIALTY
3855 South 500 West, Suite A
Salt Lake City, Utah 84115
801 269 0550

SN 10/26/16

Method ~~30B~~ Sampling Train

NCASI 99.01

SN 10/26/16

Date 10/26/16	Operators JH	Meter Box Number ~~935~~ VOST-3	
Plant Name Neucor			
Unit/Location White Swan WA		Meter Box Gamma ~~1.0000~~ SN 10/26/16	0.9959
Operating Load	Run # 3 West	Pretest Leak Check 0.000 @ 6"	
Barometric Pressure (Stack Elevation)	29.39	Posttest Leak Check 0.000 @ 6"	

Tube Number ✓ **Tube Number** ✓

Traverse Point Number	Clock Time	Elapsed Time (minutes)	Gas Meter Reading (Liters)	Rotometer Reading (LPM)	Vacuum (" of Hg)	Temperatures Stack F	Meter In F	Meter Out F	Probe F	~~Condenser~~ Filter SN 10/26 F
	1628	0	0	0.4	0		62	62	250	250
	1638	10	4.019	0.4	0		61	61	250	250
	1648	20	7.989	0.4	0		61	61	250	250
	1658	30	12.001	0.4	0		60	60	250	250
	1708	40	15.996	0.4	0		61	61	250	250
	1718	50	20.092	0.4	0		60	60	250	250
	1728	60	24.005	~~0.4~~	~~0~~		~~61~~	~~61~~		Freeze

Sample rate for VOST = 1 liter per minute, Sample rate for SLO-VOST = 0.5 liters per minute.
Maximum sample volume = 20 liters
Leak rate < 0.02 liter per minute (VOST) and < 0.01 liter per minute (SLO-VOST)
Probe temperature > or = 266 F
Condenser temp < or = 68 F

FIELD DATA SHEET 2

FORM# GSC-RM002-00
REV 2015-01, EFF 3/19/1

FaNCASI 99.02

Velocity Traverse

Client Kalicor

Date 1-12-16

Facility ~~[illegible]~~ SP 1/20/16 White Swan, WA

Personnel/Signature

Test Location Press Vent-Front

R1 - 12:47-12:56 R2 - 15:28-15:38

Note: Ensure that pitot tube is aligned parallel to the stack or duct axis.

Pitot Tube ID#	M 4-5-2	
Pitot Tube Coefficient	0.84	
Barometric Pressure (in. Hg)	29.38	
Static Pressure (in. H_2O)	0.1	
Test Location Elevation Δ From Barom. (ft)	75	
Cyclonic Flow Checked? (Y/N)		
Pre-test Leak Check:	pos	neg
ΔP (in. H_2O)	4	4
Stable for 15 seconds? (yes / no)		
Post-test Leak Check:	pos	neg
ΔP (in. H_2O)	4.5	3.5
Stable for 15 seconds? (yes / no)		
Post-Test Checks		
Pitot damaged? (yes / no)		
Flow Measurement Device ID:	RET-1	
Thermocouple Verification		
Reference thermometer ID:		
Reference thermometer reading:		°F
Thermocouple reading:		°F
Difference (must be +/- 2 °F):		°F

Comments

Start Time:			Finish Time:		
Point #	ΔP (in. H_2O)	Temp °F	Point #	ΔP (in. H_2O)	Temp °F
A-1	0.17	85	A-1	0.18	86
A-2	0.17	86	A-2	0.18	86
A-3	0.16	86	A-3	0.17	87
A-4	0.15	86	A-4	0.16	88
A-5	0.16	87	A-5	0.15	88
A-6	0.17	84	A-6	0.15	88
A-7	0.19	85	A-7	0.16	87
A-8	0.18	85	A-8	0.17	86
A-9	0.18	85	A-9	0.17	86
A-10	0.19	85	A-10	0.17	86
A-11	0.20	86	A-11	0.16	85
A-12	0.18	86	A-12	0.16	85
B-1	0.18	87	B-1	0.15	85
B-2	0.17	86	B-2	0.15	86
B-3	0.16	86	B-3	0.15	87
B-4	0.16	87	B-4	0.16	87
B-5	0.17	87	B-5	0.18	87
B-6	0.16	85	B-6	0.18	88
B-7	0.15	85	B-7	0.19	88
B-8	0.18	86	B-8	0.19	88
B-9	0.19	86	B-9	0.17	87
B-10	0.18	87	B-10	0.16	88
B-11	0.19	87	B-11	0.18	87
B-12	0.18	87	B-12	0.15	86
Average:					

GOLDEN SPECIALTY

FIELD DATA SHEET 2

FORM# GSC-RM002-00
REV 2015-01, EFF 3/19/1

For NCASI 99.02

Velocity Traverse

Client: Nucor

Date: 10/26/16

Facility: White Swan, WA

Personnel/Signature:

Test Location: Press Vent-East

R 3 - 16:52-16:53

Note: Ensure that pitot tube is aligned parallel to the stack or duct axis.

Pitot Tube ID#	MM-5-2	
Pitot Tube Coefficient	0.84	
Barometric Pressure (in. Hg)	29.38	
Static Pressure (in. H_2O)	0.1	
Test Location Elevation Δ From Barom. (ft)	75	
Cyclonic Flow Checked? (Y/N)		
Pre-test Leak Check:	pos	neg
ΔP (in. H_2O)	4	4
Stable for 15 seconds? (yes / no)		
Post-test Leak Check:	pos	neg
ΔP (in. H_2O)	4.5	4.5
Stable for 15 seconds? (yes / no)		
Post-Test Checks		
Pitot damaged? (yes / no)		
Flow Measurement Device ID:	RET-1	
Thermocouple Verification		
Reference thermometer ID:		
Reference thermometer reading:		°F
Thermocouple reading:		°F
Difference (must be +/- 2 °F):		°F

Comments

Start Time:			Finish Time:		
Point #	ΔP (in. H_2O)	Temp °F	Point #	ΔP (in. H_2O)	Temp °F
A-1	0.18	86			
A-2	0.18	85			
A-3	0.18	85			
A-4	0.17	86			
A-5	0.16	87			
A-6	0.16	88			
A-7	0.17	88			
A-8	0.16	89			
A-9	0.16	90			
A-10	0.16	88			
A-11	0.17	87			
A-12	0.17	87			
B-1	0.17	87			
B-2	0.18	87			
B-3	0.17	87			
B-4	0.17	87			
B-5	0.17	87			
B-6	0.17	87			
B-7	0.17	87			
B-8	0.16	87			
B-9	0.16	87			
B-10	0.16	86			
B-11	0.16	86			
B-12	0.16	85			
Average:					

GOLDEN SPECIALTY

GSC-TMP-Hg-001.2014.01

GOLDEN SPECIALTY
5855 South 500 West, Suite A
Salt Lake City, Utah 84115
801 269 0550

Method ~~30B~~ NCASI99.02 Sampling Train

SN 1/1/26/16

Date 10/26/16	Operators JA	Meter Box Number VOST-1	
Plant Name Nucor			
Unit/Location Press Vent East		Meter Box Gamma 1.0134	
Operating Load —	Run # 1 East	Pretest Leak Check 0.00 @ -15	
Barometric Pressure (Stack Elevation) 29.38		Posttest Leak Check 0.00 @ -5	

Tube Number — Tube Number —

Traverse Point Number	Clock Time	Elapsed Time (minutes)	Gas Meter Reading (Liters)	Rotometer Reading ~~(LPM)~~	Vacuum (" of Hg)	Temperatures Stack F	Meter In F	Meter Out F	Probe F	Condenser F	Filter F
	12:25	0	5823.97		2	—	53	66	250	—	250
	12:35	10	5827.75		1	—	53	53	250	—	250
	12:45	20	5831.63		1	—	55	57	250	—	250
	12:55	30	5835.88		1	—	57	59	250	—	250
	13:05	40	5839.87		1	—	60	62	250	—	250
	13:15	50	5843.65		1	—	62	63	250	—	250
	13:25	60	5847.91		—	End Test					

Sample rate for VOST = 1 liter per minute, Sample rate for SLO-VOST = 0.5 liters per minute.
Maximum sample volume = 20 liters
Leak rate < 0.02 liter per minute (VOST) and < 0.01 liter per minute (SLO-VOST)
Probe temperature > or = 266 F
Condenser temp < or = 68 F

GSC-TMP-Hg-001.2014.01

GOLDEN SPECIALTY
3855 South 500 West, Suite A
Salt Lake City, Utah 84115
801 269 0550

NCASI 99.02

Method ~~30B~~ Sampling Train

SNW 10/26/16

Date 10/26/16	Operators JA / AK	Meter Box Number Vost-1	
Plant Name Nevcor			
Unit/Location East Press Vent		Meter Box Gamma 1.0134	
Operating Load —	Run # 2 East	Pretest Leak Check 0.00 @ -5	
Barometric Pressure (Stack Elevation) 29.38		Posttest Leak Check 0.00 @ -5	

Tube Number — Tube Number —

Traverse Point Number	Clock Time	Elapsed Time (minutes)	Gas Meter Reading (Liters)	Glass Rotometer Reading ~~(LPM)~~	Vacuum (" of Hg)	Temperatures Stack F	Meter In F	Meter Out F	Probe F	Condenser F	Filter F
Single Point	14:30	0	5848.34	25	1	—	62	61	250	—	250
	1440/14:57	10	5852.32	25	1	—	62	61	250	—	250
		20	5856.45	25	1	—	64	64	250	—	250
		30	5860.48	25	1	—	65	65	250	—	250
		40	5864.42	25	1	—	66	67	250	—	250
		50	5868.44	25	1	—	69	68	250	—	250
	1547	60	5872.32								

Sample rate for VOST = 1 liter per minute, Sample rate for SLO-VOST = 0.5 liters per minute.
Maximum sample volume = 20 liters
Leak rate < 0.02 liter per minute (VOST) and < 0.01 liter per minute (SLO-VOST)
Probe temperature > or = 266 F
Condenser temp < or = 68 F

GOLDEN SPECIALTY
3855 South 500 West, Suite A
Salt Lake City, Utah 84115
801 269 0550

SU 1-126/16

Method ~~30B~~ Sampling Train
MCASI 99.02

Date 10/26/16	Operators JA	Meter Box Number VOST-2	
Plant Name Nucor			
Unit/Location East Press Vent		Meter Box Gamma ~~1.0167~~ SU 1/26/16 0.9187	
Operating Load —	Run # ~~2 (Duplicate)~~ 2EAST-DUP	Pretest Leak Check 0.00 @ -15	
Barometric Pressure (Stack Elevation) 29.38 SU 1/26/16		Posttest Leak Check 0.00 @ -5	

Tube Number — Tube Number —

Traverse Point Number	Clock Time	Elapsed Time (minutes)	Gas Meter Reading (Liters)	Rotometer Reading (LPM) JA 1/26/16	Vacuum (" of Hg)	Temperatures Stack F	Meter In F	Meter Out F	Probe F	~~Condenser~~ Filter SU 1/26/16 F
SP	14:30	0	2241.15	~~224~~ —	1	—	55	56	250	250
	14:40/14:57	10	2245.20	—	1	—	57	58	250	250
	15:04	20	2249.34	—	1	—	61	62	250	250
	15:14	30	2253.15	—	1	—	62	63	250	250
	15:27	40	2257.15	—	1	—	63	66	250	250
	15:37	50	2261.27	—	1	—	65	66	250	250
	15:47	60	2265.10		—	End Test —				

Sample rate for VOST = 1 liter per minute, Sample rate for SLO-VOST = 0.5 liters per minute.
Maximum sample volume = 20 liters
Leak rate < 0.02 liter per minute (VOST) and < 0.01 liter per minute (SLO-VOST)
Probe temperature > or = 266 F
Condenser temp < or = 68 F

GOLDEN SPECIALTY
5855 South 500 West, Suite A
Salt Lake City, Utah 84115
801 269 0550

SN 1/26/16

A

Method ~~30B~~ Sampling Train

NCASI 99.02

Date 10/26/16	Operators AK	Meter Box Number	VOST 1
Plant Name Nucor			
Unit/Location Press vent East		Meter Box Gamma	1.0134
Operating Load	Run # 3 ~~(primary)~~ EAST	Pretest Leak Check	0.00 @ 20"
Barometric Pressure (Stack Elevation) 29.38	SN 1/26/16	Posttest Leak Check	0.00 @ 8"

Tube Number ——— Tube Number ———

Traverse Point Number	Clock Time	Elapsed Time (minutes)	Gas Meter Reading (Liters)	glass Rotometer Reading ~~(LPM)~~	Vacuum (" of Hg)	Temperatures Stack F	Meter In F	Meter Out F	Probe F	Filter ~~Condenser~~ F
Single Point	1628	0	5873.35	25	1	—	66	66	250	25
		10	5877.28	25	1	—	67	66	250	25
		20	5881.22	25	1	—	67	67	250	25
		30	5885.39	25	1	—	68	69	250	25
		40	5889.28	25	1	—	67	69	250	25
		50	5893.26	25	1	—	70	69	250	25
	1728	60	5897.39	—	—		—			

Sample rate for VOST = 1 liter per minute, Sample rate for SLO-VOST = 0.5 liters per minute.
Maximum sample volume = 20 liters
Leak rate < 0.02 liter per minute (VOST) and < 0.01 liter per minute (SLO-VOST)
Probe temperature > or = 266 F
Condenser temp < or = 68 F

GOLDEN SPECIALTY
3855 South 500 West, Suite A
Salt Lake City, Utah 84115
801 269 0550

SN 1-12/16

Method ~~30~~B Sampling Train

NCASI99.02

Date 10/26/16	Operators JA	Meter Box Number VOST-2	
Plant Name Nucor			
Unit/Location Press Vent ~~West~~ JA 10/26 East		Meter Box Gamma ~~1.0161~~ JA 10/26 0.9187 SN 1-12/16	
Operating Load	Run # ~~3 spike~~ SN 1-12/16 3 EAST-SPIKE	Pretest Leak Check 0.00 @ -5	
Barometric Pressure (Stack Elevation) 29.38		Posttest Leak Check 0.00 @ -5	

Tube Number_____ **Tube Number**_____

Traverse Point Number	Clock Time	Elapsed Time (minutes)	Gas Meter Reading (Liters)	Rotometer Reading (LPM)	Vacuum (" of Hg)	Temperatures Stack F	Meter In F	Meter Out F	Probe F	~~Condenser~~ Filter 1-12/16 F
Single Point	16:28	0	2265.87		1		68	70	250	250
	16:38	10	2269.86		1		68	69	250	250
	16:48	20	2273.86		1		68	70	250	250
	16:58	30	2277.79		1		68	70	250	250
	17:08	40	2281.83		1		69	70	250	250
	17:18	50	2285.85		1		69	71	250	250
	17:28	60	2289.86			End Run				

Sample rate for VOST = 1 liter per minute, Sample rate for SLO-VOST = 0.5 liters per minute.
Maximum sample volume = 20 liters
Leak rate < 0.02 liter per minute (VOST) and < 0.01 liter per minute (SLO-VOST)
Probe temperature > or = 266 F
Condenser temp < or = 68 F

SPECIALTY

Plant	NUCOR	Date	10/20/16
Run Number	1	Method No.	MCASI 99-02
Sample Location	PRESS VENTS (EAST and WEST)	Train No.	1
Setup Technician	SN	Cleanup Technician	SN

Back-Half Catch

	Impinger 1	Impinger 2	Impinger 3	Impinger 4	Impinger 5	Impinger 6	Impinger 7
Final Weights (grams)							
Initial Weight (grams)							
Net Gain (grams)							

Total Impinger Catch (grams)

Back Half Wash Solution(s)

Impinger Charge Solution(s)

Post-test Impinger solution appearance:

Method 202 Purge Temp (F)	% Silica Gel Spent
0 mins	
10 mins	
20 mins	
30 mins	
40 mins	
50 mins	
60 mins	

Filter Identifications and Recoveries

	In-Stack Filter	Hot Box Filter	Method 202
Filter #			

Filter Notes:

Front Half Wash solution(s)

Sample Bottles

	Front Half			Back- Half			
	Container #	Container #	Container #	Container # 1	Container # 2	Container #	Container #
Description/ Contents				R1 EAST DI H_2O	R1 WEST DI H_2O		
Sample ID				R1 EAST	R1 WEST		
Final Wt				231.8	242.3		
Tare Wt				170.9	171.0		
Net Wash Wt				60.9	71.3		

SPECIALTY

Plant	Nevcor	Date	10/26/16
Run Number	2	Method No.	NCASI 99.02
Sample Location	PRESS VENTS (EAST and WEST)	Train No.	1
Setup Technician	SN	Cleanup Technician	SN

Back-Half Catch

	Impinger 1	Impinger 2	Impinger 3	Impinger 4	Impinger 5	Impinger 6	Impinger 7
Final Weights (grams)							
Initial Weight (grams)							
Net Gain (grams)							

Total Impinger Catch (grams)

Back Half Wash Solution(s)

Impinger Charge Solution(s)

Post-test Impinger solution appearance:

Method 202	% Silica Gel Spent
Purge Temp (F)	
0 mins	
10 mins	
20 mins	
30 mins	
40 mins	
50 mins	
60 mins	

Filter Identifications and Recoveries

	In-Stack Filter	Hot Box Filter	Method 202
Filter #			

Filter Notes:

Front Half Wash solution(s)

Sample Bottles

	Front Half			Back- Half			
	Container #	Container #	Container #	Container # 1	Container # 2	Container # 3	Container #
Description/ Contents			SM 10/26/16	~~R2~~ DIH2O	DIH2O	DIH2O	
Sample ID				R2 EAST	R2 WEST	R2 EAST -DUP	
Final Wt				236.5	244.3	239.0	
Tare Wt				169.7	170.0	169.5	
Net Wash Wt				66.8	74.3	69.5	

SPECIALTY

Plant	NUCOR	Date	10/28/16
Run Number	3	Method No.	NCASI 99.02
Sample Location	PRESSURMTS (EAST + WEST)	Train No.	1
Setup Technician	SN	Cleanup Technician	SN

Back-Half Catch

	Impinger 1	Impinger 2	Impinger 3	Impinger 4	Impinger 5	Impinger 6	Impinger 7
Final Weights (grams)							
Initial Weight (grams)							
Net Gain (grams)							

Method 202 Purge Temp (F)	% Silica Gel Spent
0 mins	
10 mins	
20 mins	
30 mins	
40 mins	
50 mins	
60 mins	

Total Impinger Catch (grams)

Back Half Wash Solution(s)

Impinger Charge Solution(s)

Post-test Impinger solution appearance:

Filter Identifications and Recoveries

	In-Stack Filter	Hot Box Filter	Method 202
Filter #			

Filter Notes:

Front Half Wash solution(s)

Sample Bottles

	Front Half			Back- Half			
	Container #	Container #	Container #	Container # 1	Container # 2	Container # 3	Container #
Description/ Contents				DIH2O	DIH2O	DIH2O	
Sample ID				R3 EAST	R3 WEST	R3 EAST -SPIKE	
Final Wt				244.6	245.2	246.9	
Tare Wt				172.7	171.4	171.3	
Net Wash Wt				71.9	73.8	75.6	

GOLDEN SPECIALTY

USEPA Method 4 Field Data Sheet

Test Date: 10/26/16
Project Number: 160282
Location: Newco
Process: Press Vent
Source Name: Press Vent
Operators: SN
Run Number: 1

Filter Number:
Nozzle ID:
Nozzle Dia. (in.):
Meter Box ID: RET-1
ΔH@: 1.669
Meter Y: 0.977
P_{bar} (in. H_g): 29.38
P_{static} (in. H_2O):

Train ID
Hot Box ID
Pitot Coeff:
Probe/Pitot ID:
Stack TC ID:
Probe TC ID:
Effective Length:
Liner (SS, glass): SS
Stack Diam/LxW 40.1inch

Leak Checks

Pitot Line	OK ?	in H2O ?
Pre-test (-):		
Pre-test (+):		
Post-test (-):		
Post-test (+):		

Sample Train	(Pretest)	(Post test)
Leak Rate:	0.0	0.0
Vac:	15"	10"
If needed:	(Mid)	(Mid)
Leak Rate:		
Vac:		

Traverse Point	Clock Time	Elapsed Time	ΔP (in. H_2O)	Meter Conditions ΔH	Meter Conditions Meter Volume	Temperature (°F) Stack	Temperature (°F) Probe	Temperature (°F) Oven	Meter (°F) In	Meter (°F) Out	Imp Out (°F)	Vac (in. Hg)		
Single Point	12:25	0		1.5	908.640				51	52	60	2		
	12:35	10		1.5	915.7				52	52	58	2		
	12:45	20		1.5	922.75				53	54	56	2		
	12:55	30		1.5	929.85				54	55	56	2		
	13:05	40		1.5	936.89				55	55	55	2		
	13:15	50		1.5	943.9				55	55	55	2		
	13:25	60		1.5	950.999			End Run						

SPECIALTY

Plant	Pecan	Date	10/26/16
Run Number	1	Method No.	4
Sample Location	PressVent	Train No.	1
Setup Technician	SN	Cleanup Technician	SN

Back-Half Catch

	Impinger 1	Impinger 2	Impinger 3	Impinger 4	Impinger 5	Impinger 6	Impinger 7
Final Weights (grams)	754.5	748.3	630.7	905.6			
Initial Weight (grams)	754.6	748.0	629.5	892.4			
Net Gain (grams)	-0.1	0.3	1.2	13.2			

Method 202	% Silica Gel Spent
Purge Temp (F)	
0 mins	0
10 mins	
20 mins	
30 mins	50
40 mins	
50 mins	
60 mins	

Total Impinger Catch (grams) ~~14.8~~ SN 10/26/16 14.6

Back Half Wash Solution(s)

Impinger Charge Solution(s) DI H_2O

Post-test Impinger solution appearance: Clear

Filter Identifications and Recoveries

	In-Stack Filter	Hot Box Filter	Method 202
Filter #			

Filter Notes:

Front Half Wash solution(s)

Sample Bottles

	Front Half			Back-Half			
	Container #	Container #	Container #	Container #	Container #	Container #	Container #
Description/ Contents							
Sample ID							
Final Wt							
Tare Wt							
Net Wash Wt							

GOLDEN SPECIALTY

USEPA Method 4 Field Data Sheet

Page ___ of ___

Test Date:	10/26/18	Filter Number:		Train ID	
Project Number:	160282	Nozzle ID:		Hot Box ID	
Location:	Neuco	Nozzle Dia. (in.):		Pitot Coeff:	
Process:	Press Vent	Meter Box ID:	RET-1	Probe/Pitot ID:	
Source Name:	Press Vent	ΔH@:	1.669	Stack TC ID:	
Operators:	SN	Meter Y:	0.977	Probe TC ID:	
		P_{bar} (in. H_g):	29.38	Effective Length:	
		P_{static} (in. H_2O):		Liner (SS, glass):	SS
Run Number:	2			Stack Diam/LxW	46 in

Leak Checks

Pitot Line	OK ?	in H2O ?
Pre-test (-):		
Pre-test (+):		
Post-test (-):		
Post-test (+):		

Sample Train	(Pretest)	(Post test)
Leak Rate:	000	0.001
Vac:	15"	5"
If needed:	(Mid)	(Mid)
Leak Rate:		
Vac:		

Traverse Point	Clock Time	Elapsed Time	ΔP (in. H_2O)	Meter Conditions ΔH	Meter Conditions Meter Volume	Temperature (°F) Stack	Temperature (°F) Probe	Temperature (°F) Oven	Meter (°F) In	Meter (°F) Out	Imp Out (°F)	Vac (in. Hg)		
Single Pt	14:30	0		1.5	952.454				62	61	58	3		
	14:57	10		1.5	960.45				62	61	59	3		
	15:07	20		1.5	967.5				63	62	60	3		
	15:17	30		1.5	974.62				63	63	59	3		
	15:27	40		1.5	981.55				63	64	59	3		
	15:37	50		1.5	988.67				64	65	59	3		
	15:47	60			995.725			Final Run 2						

SPECIALTY

Plant	Nelson	Date	1-/26/16
Run Number	2	Method No.	4
Sample Location	Press Vent	Train No.	2
Setup Technician	SN	Cleanup Technician	SN

Back-Half Catch

	Impinger 1	Impinger 2	Impinger 3	Impinger 4	Impinger 5	Impinger 6	Impinger 7
Final Weights (grams)	762.5	752.0	632.6	925.6			
Initial Weight (grams)	762.8	751.4	632.6	912.3			
Net Gain (grams)	-0.3	0.6	0.0	13.3			

Method 202	% Silica Gel Spent
Purge Temp (F)	
0 mins	0
10 mins	
20 mins	60
30 mins	
40 mins	
50 mins	
60 mins	

Total Impinger Catch (grams): 13.6

Back Half Wash Solution(s): —

Impinger Charge Solution(s): DI H_2O

Post-test Impinger solution appearance: clear

Filter Identifications and Recoveries

	In-Stack Filter	Hot Box Filter	Method 202
Filter #			

Filter Notes:

Front Half Wash solution(s)

Sample Bottles

	Front Half			Back- Half			
	Container #	Container #	Container #	Container #	Container #	Container #	Container #
Description/ Contents							
Sample ID							
Final Wt							
Tare Wt							
Net Wash Wt							

GOLDEN SPECIALTY

USEPA Method 4 Field Data Sheet

Page ___ of ___

Test Date: 10/26/18
Project Number: 160282
Location: Neuco
Process: Press Vent
Source Name: Press Vent
Operators: SR
Run Number: 3

Filter Number: —
Nozzle ID: —
Nozzle Dia. (in.): —
Meter Box ID: RET-1
ΔH@: 1.668
Meter Y: 0.977
P_{bar} (in. H_g): 29.38
P_{static} (in. H_2O): —

Train ID —
Hot Box ID —
Pitot Coeff: —
Probe/Pitot ID: —
Stack TC ID: —
Probe TC ID: —
Effective Length: —
Liner (SS, glass): SS
Stack Diam/LxW 48"

Leak Checks

Pitot Line	OK ?	in H2O ?
Pre-test (-):		
Pre-test (+):		
Post-test (-):		
Post-test (+):		

Sample Train	(Pretest)	(Post test)
Leak Rate:	0.002	0.002
Vac:	10"	5"
If needed:	(Mid)	(Mid)
Leak Rate:		
Vac:		

Traverse Point	Clock Time	Elapsed Time	ΔP (in. H_2O)	Meter Conditions ΔH	Meter Conditions Meter Volume	Temperature (°F) Stack	Temperature (°F) Probe	Temperature (°F) Oven	Meter (°F) In	Meter (°F) Out	Imp Out (°F)	Vac (in. Hg)		
Single Pt	16:29	0	—	1.5	999.423	—	—	—	65	65	59	3		
	16:39	10	—	1.5	1005.5	—	—	—	66	66	59	3		
	16:49	20	—	1.5	1012.55	—	—	—	67	67	59	2		
	16:59	30	—	1.5	1019.70	—	—	—	67	67	60	2		
	17:09	40	—	1.5	1026.85	—	—	—	67	68	61	2		
	17:19	50	—	1.5	1033.90	—	—	—	68	68	61	2		
	17:29	60	—	—	1040.993	—	—	—	End Run 3					

SPECIALTY

Plant	Nemor	Date	10/26/16
Run Number	3	Method No.	4
Sample Location	Press Vent	Train No.	3K-10-26 1
Setup Technician	SN	Cleanup Technician	SN

Back-Half Catch

	Impinger 1	Impinger 2	Impinger 3	Impinger 4	Impinger 5	Impinger 6	Impinger 7
Final Weights (grams)	754.7	748.6	631.8	918.6			
Initial Weight (grams)	754.5	748.3	630.7	905.6			
Net Gain (grams)	0.2	0.3	1.1	13.0			

Method 202	% Silica Gel Spent
Purge Temp (F)	
0 mins	50
10 mins	
20 mins	90
30 mins	
40 mins	
50 mins	
60 mins	

Total Impinger Catch (grams) 14.6

Back Half Wash Solution(s) —

Impinger Charge Solution(s) DI H_2O

Post-test Impinger solution appearance: Clear

Filter Identifications and Recoveries

	In-Stack Filter	Hot Box Filter	Method 202
Filter #			

Filter Notes:

Front Half Wash solution(s)

Sample Bottles

	Front Half			Back- Half			
	Container #	Container #	Container #	Container #	Container #	Container #	Container #
Description/ Contents							
Sample ID							
Final Wt							
Tare Wt							
Net Wash Wt							

FIELD DATA SHEET 1
Sampling Velocity Traverse Points

FORM# GSC-RM001-001
REV 2015-02, EFF 7/7/15

Client/Plant Name: Nexar Job#: 160282

City/State: White Swan, WA Date/Time: 10/27/16

Test Location: Line Former Personnel: SN/JA/JH/SU

Port Inside Diameter	4 inches		
Distance from Far Wall to Outside of Port	32 inches		
Nipple Length and/or Wall Thickness	4 inches		
Stack/Duct (√) Blue Print ( )	Measured (X)		
Depth/Diameter (>12 in. ?)	28 inches		
Width (if rectangular)	48 inches		
Equiv. Diameter (if rect.) $D_e = 2\,D\,W/(D + W)$	35.4		
Area (A) (>113in.²?) $A = \pi D^2/4$ or $D\,W$	9.33 sq ft		
Distance From Flow Disturbance to Port	Distance	D_e	No. Pts*
Upstream (≥ 0.5 D_e?)	19	0.54	25
Downstream (≥ 2.0 D_e?)	29	3.11	25
Cyclonic Flow Checked?	Yes	No	NA
Rectangular Matrix	5x5		

*Circle larger of two

Pt.	%Duct Depth	Dist from Inside Wall*	Dist from Oustide of Port
1	10%	2.8	6.8
2	30%	8.4	12.4
3	50%	14.0	18.0
4	70%	19.6	23.6
5	90%	25.2	29.2
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			

*Do not place closer to stack walls than:
1.0 in. for stack dia > 24 in.
0.5 in. for stack dia 12 to ≤ 24 in.

Sketch of Location: In the space above, sketch a flow diagram of the test location; show the distance from the ports to the distrubances before & after. Sketch the cross-sectional area; show sampling port locations. In horizontal ducts, check for dust buildups & measure or estimate the depth.

QA/QC Check
Completeness ✓ Legibility ✓ Accuracy ✓ Specifications ✓ Reasonableness ✓

Checked by: _____ Personnel (Signature/Date) _____ Team Leader (Signature/Date)

GOLDEN SPECIALTY

CYCLONIC FLOW DETERMINATION

FORM # GSC-RM001-003
REV 2014-02, EFF 10/31/14

Plant Name Neenah
Job No. 160282
City/State White Swan, WA
Date 6/27/16
Test Loc. Lime Former
Personnel SN
Barometric Pres. (Pbar) 28.90 In. Hg
Static Pres. (Pg) 0.15 In. H_2O
Pitot/Orfices ID TIM 5-1
Pitot Coef. (C_p) 0.84
Pres. Gauge Set ID CCI-1
Thermocouple ID TC-TIM-5-1
Duct/Stack Dimensions 24x48

Pitot Tube Leak Checks	Ok ?	in H_2O
Pre-test (-)	✓	4
Pre-test (+)	✓	4
Post-test (-)	✓	4
Post-test (+)	✓	4

CYCLONIC FLOW CHECK

Start - Finish Times
8:00 - 8:15

Note: Yaw angle average is sum of the absolute values divided by the number of measurements, and must be <20°.

Test Pt.	Yaw Angle. °ø
A-1	5
A-2	5
A-3	0
A-4	0
A-5	0
B-1	5
B-2	10
B-3	0
B-4	2
B-5	5
C-1	0
C-2	0
C-3	5
C-4	2
C-5	-1
D-1	10
D-2	2
D-3	2
D-4	0
D-5	0
E-1	7
E-2	7
E-3	5
E-4	0
~~Avg.~~ E-5	0
Avg.	2.92

6/27 SN

GOLDEN SPECIALTY

USEPA Method 2/4 Field Data Sheet ~~(Continuation Page)~~

Page 1 of ____

Test Date: 10/27/16
Project Number: 160282
Source Name: Line Former
Operators: JA/AK

Run Number: 1
Line Former

Pitot ID - TIM 5-1
M. Box ID - CCI-1
DH = 1.589
Y = 1.010
Pbar = 28.90 Pstatic = 0.15

Leak Checks				
Pitot Line	OK ?	in H2O ?	Sample Train	(Pretest) / (Post test)
Pre-test (-):	✓	4	Leak Rate:	0.00 / 00
Pre-test (+):	✓	4	Vac:	15 / 7"
Post-test (-):	✓	4	If needed: (Mid)	(Mid)
Post-test (+):	✓	4	Leak Rate:	
			~~Vac:~~	

Traverse Point	Clock Time	Elapsed Time	ΔP (in. H_2O)	Meter Conditions ΔH	Meter Conditions Meter Volume	Temperature (°F) Stack	Temperature (°F) Probe	Temperature (°F) Oven	Meter (°F) In	Meter (°F) Out	Imp Out (°F)	Vac (in. Hg)		
A1	9:02	0	0.04	1.5	928.690	68	—	—	52	53	58	5.5		
2	9:12	10	0.05	1.5	935.75	70	—	—	53	52	58	5.5		
3	9:22	20	0.06	1.5	942.77	72	—	—	56	53	60	5.5		
4	9:33	30	0.07	1.5	949.71	73	—	—	57	53	60	5.5		
5	9:43	40	0.05	1.5	956.68	73	—	—	58	53	62	5.5		
B1	9:53	50	0.04	1.5	963.67	73	—	—	59	54	62	5.5		
2	10:03	60	0.06	~~1.5~~	970.665	73	—	—	End	Run	—	—		
3			0.07	JA 10/27		73								
4			0.07			73								
5			0.05			73								
C1			0.05			73								
2			0.07			73								
3			0.07			73								
4			0.07			73								
5			0.04			73								
D1			0.04			73								
2			0.06			73								
3			0.06			73								
4			0.07			73								
5			0.06			73								
E1			0.05			73								
2			0.05			73								
3			0.07			73								
4			0.07			73								
5			0.05			73								

GOLDEN SPECIALTY

Plant	NEUCOR	Date	10/27/16
Run Number	1	Method No.	4
Sample Location	Line Former	Train No.	1
Setup Technician	SN	Cleanup Technician	SN

Back-Half Catch

	Impinger 1	Impinger 2	Impinger 3	Impinger 4	Impinger 5	Impinger 6	Impinger 7
Final Weights (grams)	753.9	742.0	628.7	891.2			
Initial Weight (grams)	754.5	741.4	628.7	876.7			
Net Gain (grams)	-0.6	0.6	0.0	14.5			

Method 202	% Silica Gel Spent
Purge Temp (F)	
0 mins	0
10 mins	
20 mins	
30 mins	40%
40 mins	
50 mins	
60 mins	

Total Impinger Catch (grams) 14.5

Back Half Wash Solution(s) —

Impinger Charge Solution(s) DI H_2O

Post-test Impinger solution appearance: Clear

Filter Identifications and Recoveries

	In-Stack Filter	Hot Box Filter	Method 202
Filter #			

Filter Notes:

Front Half Wash solution(s)

Sample Bottles

	Front Half			Back- Half			
	Container #	Container #	Container #	Container #	Container #	Container #	Container #
Description/ Contents							
Sample ID							
Final Wt							
Tare Wt							
Net Wash Wt							

GOLDEN SPECIALTY

USEPA Method 2/4 Field Data Sheet

Test Date: 10/27/16
Project Number: 160382
Location: Nevada
Process: Line Former
Source Name: ~~Press vent~~ JA 10/27
Operators: JA/AK

Filter Number:
Nozzle ID:
Nozzle Dia. (in.):
Meter Box ID: CCI-1
ΔH@: 1.569
Meter Y: 1.016
P_{bar} (in. H_g): 28.90
P_{static} (in. H_2O): 0.15

Run Number: 2

Train ID
Hot Box ID
Pitot Coeff: 0.84
Probe/Pitot ID: TIM5-1
Stack TC ID: TC-TIM5-1
Probe TC ID:
Effective Length: 5ft
Liner (SS, glass):
Stack Diam/LxW 28x48

Leak Checks			
Pitot Line	OK ?	in H2O ?	
Pre-test (-):	✓	4	10/27
Pre-test (+):	✓	4	
Post-test (-):	✓	4	
Post-test (+):	✓	4	

Sample Train	(Pretest)	(Post test)
Leak Rate:	0.010	0.010
Vac:	-10	-8
If needed:	(Mid)	(Mid)
Leak Rate:		
Vac:		

Traverse Point	Clock Time	Elapsed Time	ΔP (in. H_2O)	Meter Conditions ΔH	Meter Conditions Meter Volume	Temperature (°F) Stack	Temperature (°F) Probe	Temperature (°F) Oven	Meter (°F) In	Meter (°F) Out	Imp Out (°F)	Vac (in. Hg)		
A1	10:28	0	0.13	1.5	970.944	76	—	—	54	53	56	6		
2	10:38	10	0.13	1.5	978.48	76	—	—	56	53	60	6		
3	10:48	20	0.13	1.5	985.44	76	—	—	58	54	64	6		
4	10:58	30	0.13	1.5	992.42	76	—	—	59	54	64	6		
5	11:08	40	0.13	1.5	999.36	76	—	—	60	55	64	6		
B1	11:18	50	0.13	1.5	1006.36	76	—	—	61	55	63	6		
2	11:28	60	0.13	—	1013.248	76	—	—	End Test					
3			0.13			76								
4			0.13			76								
5			0.13			76								
C1			0.13			76								
2			0.13			76								
3			0.13			76								
4			0.13			76								
5			0.13			76								
D1			0.13			76								
2			0.13			76								
3			0.13			76								
4			0.13			76								
5			0.13			76								
E1			0.13			76								
2			0.13			76								
3			0.13			76								
4			0.13			76								
5			0.13			76								

GOLDEN SPECIALTY

Plant	MBUCCR	Date	10/27/16
Run Number	2	Method No.	4
Sample Location	Line former	Train No.	2
Setup Technician	SN	Cleanup Technician	SN

Back-Half Catch

	Impinger 1	Impinger 2	Impinger 3	Impinger 4	Impinger 5	Impinger 6	Impinger 7
Final Weights (grams)	639.0	799.7	543.8	874.8			
Initial Weight (grams)	638.5	798.2	543.9	861.3			
Net Gain (grams)	0.5	1.5	0.9	13.5			

Method 202	% Silica Gel Spent
Purge Temp (F)	0
0 mins	
10 mins	
20 mins	
30 mins	50%
40 mins	
50 mins	
60 mins	

Total Impinger Catch (grams): 16.4

Back Half Wash Solution(s): —

Impinger Charge Solution(s): DI H_2O

Post-test Impinger solution appearance: Clear

Filter Identifications and Recoveries

	In-Stack Filter	Hot Box Filter	Method 202
Filter #			

Filter Notes:

Front Half Wash solution(s)

Sample Bottles

	Front Half			Back- Half			
	Container #	Container #	Container #	Container #	Container #	Container #	Container #
Description/ Contents							
Sample ID							
Final Wt							
Tare Wt							
Net Wash Wt							

GOLDEN SPECIALTY

USEPA Method 2/4 Field Data Sheet

Page ___ of ___

Test Date: 10/27/16
Project Number: 160282
Location: Nevcor
Process: Line Former
Source Name: Line Former
Operators: JA/AK
Run Number: 3

Filter Number:
Nozzle ID:
Nozzle Dia. (in.):
Meter Box ID: CCJ-1
ΔH@: 1.547
Meter Y: 1.010
P_{bar} (in. H_g): 28.90
P_{static} (in. H_2O): +0.15

Train ID
Hot Box ID
Pitot Coeff: 0.84
Probe/Pitot ID: TI M-S-1
Stack TC ID: TC-TIM-S-1
Probe TC ID:
Effective Length: 5 ft
Liner (SS, glass): ~~5 ft~~
Stack Diam/LxW: 28x48

Leak Checks

Pitot Line	OK ?	in H2O ?
Pre-test (-):	✓	4
Pre-test (+):	✓	4
Post-test (-):	✓	4
Post-test (+):	✓	4

Sample Train	(Pretest)	(Post test)
Leak Rate:	0.010	0.010
Vac:	-10	-10
If needed: Leak Rate:	(Mid)	(Mid)
~~Vac:~~		

Traverse Point	Clock Time	Elapsed Time	ΔP (in. H_2O)	Meter Conditions ΔH	Meter Conditions Meter Volume	Temperature (°F) Stack	Temperature (°F) Probe	Temperature (°F) Oven	Meter (°F) In	Meter (°F) Out	Imp Out (°F)	Vac (in. Hg)		
A 1	11:47	0	0.24	1.5	13.678	73	—	—	54	54	58	6		
2	11:57	10	0.24	1.5	20.68	73	—	—	56	54	62	6		
3	12:07	20	0.24	1.5	27.68	73	—	—	58	54	64	6		
4	12:17	30	0.24	1.5	34.68	73	—	—	59	54	66	6		
A ~~5~~	12:27	40	0.24	1.5	41.65	73	—	—	60	55	64	6		
B ~~1~~	12:37	50	0.24	1.5	48.62	73	—	—	61	55	61	6		
~~2~~	12:47	60	0.24	—	55.609	73	—	—	End Run			—		
~~3~~			0.24			73								
~~4~~			0.24			73								
~~5~~			0.24			73								
C1			0.24			73								
2			0.24			73								
3			0.24			73								
4			0.24			73								
5			0.24			73								
D1			0.24			73								
2			0.24			73								
3			0.24			73								
4			0.24			73								
5			0.24			73								
E 1			0.24			73								
2			0.24			73								
3			0.24			73								
4			0.24			73								
5			0.24			73								

GOLDEN SPECIALTY

Plant	NUCOR	Date	10/27/16
Run Number	3	Method No.	4
Sample Location	Line Former	Train No.	1
Setup Technician	SN	Cleanup Technician	SN

Back-Half Catch

	Impinger 1	Impinger 2	Impinger 3	Impinger 4	Impinger 5	Impinger 6	Impinger 7
Final Weights (grams)	753.7	742.0	630.1	901.4			
Initial Weight (grams)	753.9	742.0	628.7	891.2			
Net Gain (grams)	-0.2	0.0	1.4	10.2			

Method 202	% Silica Gel Spent
Purge Temp (F)	40%
0 mins	
10 mins	
20 mins	90%
30 mins	
40 mins	
50 mins	
60 mins	

Total Impinger Catch (grams) 11.4

Back Half Wash Solution(s) —

Impinger Charge Solution(s) DI H_2O

Post-test Impinger solution appearance: Clear

Filter Identifications and Recoveries

	In-Stack Filter	Hot Box Filter	Method 202
Filter #			

Filter Notes:

Front Half Wash solution(s)

Sample Bottles

	Front Half			Back- Half			
	Container #	Container #	Container #	Container #	Container #	Container #	Container #
Description/ Contents							
Sample ID							
Final Wt							
Tare Wt							
Net Wash Wt							

GOLDEN SPECIALTY
3855 South 500 West, Suite A
Salt Lake City, Utah 84115
801 269 0550

SJ 10/27/16

Method 30B Sampling Train

NCASI 99.02

Date 10/27/16	Operators JH / AK	Meter Box Number	VOST-1
Plant Name Neucor			
Unit/Location White Swan WA Line Former		Meter Box Gamma	1.0134
Operating Load	Run # 1	Pretest Leak Check	0.00 @ 10"
Barometric Pressure (Stack Elevation) 28.90		Posttest Leak Check	0.00 @ 5"

Tube Number ____ Tube Number ____ 011/30/16

Traverse Point Number	Clock Time	Elapsed Time (minutes)	Gas Meter Reading (Liters)	Rotometer Reading (LPM)	Vacuum (" of Hg)	Temperatures: Stack F	Meter In F	Meter Out F	Probe F	Condenser F	Filter F
	8:29	0	5897.56	0.4	0		54	53	250		250
	8:31 ~~940~~ 943	10	5903.30	0.4	0		54	53	250		250
JH 10/27	~~940~~ 943	20	5909.95	0.4	0		54	53	250		250
	933	30	5909.19	0.4	0		55	55	251		252
	943	40	5913.50	0.4	0		54	57	252		250
	953	50	5917.52	0.4	0		56	58	250		250
	10:03	60	5921.50	~~0.4~~	~~0~~		~~54~~	~~59~~	011/30/16		

Sample rate for VOST = 1 liter per minute, Sample rate for SLO-VOST = 0.5 liters per minute.
Maximum sample volume = 20 liters
Leak rate < 0.02 liter per minute (VOST) and < 0.01 liter per minute (SLO-VOST)
Probe temperature > or = 266 F
Condenser temp < or = 68 F

GSC-TMP-Hg-001.2014.01

GOLDEN SPECIALTY
3855 South 500 West, Suite A
Salt Lake City, Utah 84115
801 269 0550

SN D/22

Method 30B Sampling Train

NCASI 99.02

Date 10/27/16	Operators JA/AK	Meter Box Number VOST-2	
Plant Name Neenah			
Unit/Location Line former		Meter Box Gamma ~~1.0161~~ SN 1-127	0.9187
Operating Load	Run # 1-Duplicate	Pretest Leak Check	0.00 @ 10"
Barometric Pressure (Stack Elevation)	28.90	Posttest Leak Check	0.00 @ 5"

Tube Number _____ Tube Number _____

on 10/16

Traverse Point Number	Clock Time	Elapsed Time (minutes)	Gas Meter Reading (Liters)	Rotometer Reading (LPM)	Vacuum (" of Hg)	METER IN Temperatures ~~Stack~~ SN 1-127 F	Meter In ~~Out~~ F	~~Meter Out~~ F	Probe F	Condenser F	Filter F
	8:27	0	2290.24	1	1	55	56		250		250
	8:31 9:13	10	2294.55	JA 10/27	1	56	56		250		250
	9:23	20	2298.45		1	58	58		250		250
	9:33	30	2302.27		1	58	58		250		250
	9:43	40	2306.27		1	58	60		250		250
	9:53	50	2310.23		1	66	61		250		250
	10:03	60	2314.27		End Run						
	0	0122/16									

Sample rate for VOST = 1 liter per minute, Sample rate for SLO-VOST = 0.5 liters per minute.
Maximum sample volume = 20 liters
Leak rate < 0.02 liter per minute (VOST) and < 0.01 liter per minute (SLO-VOST)
Probe temperature > or = 266 F
Condenser temp < or = 68 F

GOLDEN SPECIALTY
5855 South 500 West, Suite A
Salt Lake City, Utah 84115
801 269 0550

NCASI 99.02

Method ~~30B~~ Sampling Train

SN 10/27

Date 10/27/16	Operators JH/AK	Meter Box Number	VOST-1
Plant Name Nencor			
Unit/Location Line Former		Meter Box Gamma	1-0134
Operating Load	Run # 2	Pretest Leak Check	0.00 @ 10"
Barometric Pressure (Stack Elevation)	28.90	Posttest Leak Check	0.00 @ 5"

Tube Number ___/___ Tube Number ___/___

Traverse Point Number	Clock Time	Elapsed Time (minutes)	Gas Meter Reading (Liters)	Rotometer Reading (LPM)	Vacuum (" of Hg)	Temperatures Stack F	Meter In F	Meter Out F	Probe F	~~Condenser~~ Filter F
	10:26	0	5921.85	—	1	—	58	59	250	250
	1036	10	5925.80	—	1	—	58	59	250	250
	1046	26	5929.81	—	1	—	59	59	250	250
	1056	30	5933.61	—	1	—	60	59	250	250
	1106	40	5937.77	—	0	—	61	61	250	250
	1116	50	5941.74	—	0	—	62	63	250	250
	1126	60	5945.76	—	~~0~~	—	~~63~~	~~64~~	—	~~End Run~~

SN 10/27

a 11/30/16

Sample rate for VOST = 1 liter per minute, Sample rate for SLO-VOST = 0.5 liters per minute.
Maximum sample volume = 20 liters
Leak rate < 0.02 liter per minute (VOST) and < 0.01 liter per minute (SLO-VOST)
Probe temperature > or = 266 F
Condenser temp < or = 68 F

GOLDEN SPECIALTY
3855 South 500 West, Suite A
Salt Lake City, Utah 84115
801 269 0550

Method 30B Sampling Train

Date 10/27/16	Operators JA/AK	Meter Box Number VOST-2	
Plant Name Nevcor			
Unit/Location Line Former		Meter Box Gamma ~~1.0161~~ SN 1127 0.9187	
Operating Load —	Run # 2 (spike)	Pretest Leak Check 0.00	@ 10"
Barometric Pressure (Stack Elevation) 28.90		Posttest Leak Check 0.00	@ 5"

a 11/30/16

Tube Number_____ Tube Number_____

Traverse Point Number	Clock Time	Elapsed Time (minutes)	Gas Meter Reading (Liters)	Rotometer Reading (LPM)	Vacuum (" of Hg)	Temperatures Stack F	Meter In F	Meter Out F	Probe F	~~Condenser~~ Filter F
Single Point	10:26	0	2314.80	—	1	—	60	59	250	250
	10:36	10	2316.98	—	1	—	58	59	250	250
	10:46	20	2322.81	—	1	—	59	59	250	250
	10:56	30	2327.02	—	1	—	60	61	250	250
	11:06	40	2330.85	—	1	—	62	63	250	250
	11:16	50	2334.99	—	1	—	63	60	250	250
	11:26	60	2338.78	—	—	End Run	—	—		

SN 1127

Sample rate for VOST = 1 liter per minute, Sample rate for SLO-VOST = 0.5 liters per minute.
Maximum sample volume = 20 liters
Leak rate < 0.02 liter per minute (VOST) and < 0.01 liter per minute (SLO-VOST)
Probe temperature > or = 266 F
Condenser temp < or = 68 F

GOLDEN SPECIALTY
3855 South 500 West, Suite A
Salt Lake City, Utah 84115
801 269 0550

Method ~~30B~~ Sampling Train
MCASI 99-02

Date 10/27/16	Operators JH/AK	Meter Box Number	VOST-1
Plant Name Nucor			
Unit/Location Line		Meter Box Gamma	1.0134
Operating Load	Run # 3	Pretest Leak Check	0.00 @ 10"
Barometric Pressure (Stack Elevation)	28.90	Posttest Leak Check	0.00 @ 5"

Tube Number ——— Tube Number ———

Traverse Point Number	Clock Time	Elapsed Time (minutes)	Gas Meter Reading (Liters)	Rotometer Reading (LPM)	Vacuum (" of Hg)	Temperatures Stack F	Meter In F	Meter Out F	Probe F	~~Condenser~~ Filter F
	1147	0	5946.02	—	1	—	70	63	250	250
	1157	10	5950.01	—	0	—	62	60	250	250
	1207	20	5954.04	—	0	—	62	60	250	250
	1217	30	5957.97	—	0	—	62	60	250	250
	1227	40	5962.03	—	0	—	61	60	250	250
	1237	50	5966.98	—	0	—	64	65	250	250
	1247	60	5970.00	—	~~0~~	—	~~64~~	65	—	—

SM 1427

Sample rate for VOST = 1 liter per minute, Sample rate for SLO-VOST = 0.5 liters per minute.
Maximum sample volume = 20 liters
Leak rate < 0.02 liter per minute (VOST) and < 0.01 liter per minute (SLO-VOST)
Probe temperature > or = 266 F
Condenser temp < or = 68 F

GOLDEN SPECIALTY

Plant	NEUCC R	Date	10/27/16
Run Number	1	Method No.	NCASI 99.02
Sample Location	Line Former	Train No.	1
Setup Technician	SN	Cleanup Technician	SN

Back-Half Catch

	Impinger 1	Impinger 2	Impinger 3	Impinger 4	Impinger 5	Impinger 6	Impinger 7
Final Weights (grams)							
Initial Weight (grams)							
Net Gain (grams)							

Method 202	% Silica Gel Spent
Purge Temp (F)	
0 mins	
10 mins	
20 mins	
30 mins	
40 mins	
50 mins	
60 mins	

Total Impinger Catch (grams)

Back Half Wash Solution(s)

Impinger Charge Solution(s)

Post-test Impinger solution appearance:

Filter Identifications and Recoveries

	In-Stack Filter	Hot Box Filter	Method 202
Filter #			

Filter Notes:

Front Half Wash solution(s)

Sample Bottles

	Front Half			Back- Half			
	Container #	Container #	Container #	Container # 1	Container # 2	Container #	Container #
Description/ Contents				DI H_2O	DI H_2O		
Sample ID				Line Former -1	Line Former -1 Dup		
Final Wt				246.5	247.5		
Tare Wt				171.5	172.2		
Net Wash Wt				75	75.3		

GOLDEN SPECIALTY

Plant	NUCOR	Date	10/27/16
Run Number	2	Method No.	MCASI-99.02
Sample Location	Line Former	Train No.	3
Setup Technician	SN	Cleanup Technician	SN

Back-Half Catch

	Impinger 1	Impinger 2	Impinger 3	Impinger 4	Impinger 5	Impinger 6	Impinger 7
Final Weights (grams)							
Initial Weight (grams)							
Net Gain (grams)							

Method 202	% Silica Gel Spent
Purge Temp (F)	
0 mins	
10 mins	
20 mins	
30 mins	
40 mins	
50 mins	
60 mins	

Total Impinger Catch (grams)

Back Half Wash Solution(s)

Impinger Charge Solution(s)

Post-test Impinger solution appearance:

Filter Identifications and Recoveries

	In-Stack Filter	Hot Box Filter	Method 202
Filter #			

Filter Notes:

Front Half Wash solution(s)

Sample Bottles

	Front Half			Back- Half			
	Container #	Container #	Container #	Container # 1	Container # 2	Container #	Container #
Description/ Contents				DIH_2O	DIH_2O		
Sample ID				Line Former -2	Line Former -2 Spike		
Final Wt				246.0	245.4		
Tare Wt				170.5	170.4		
Net Wash Wt				75.5	75.0		

GOLDEN SPECIALTY

Plant	NEUCOR	Date	10/27/16
Run Number	3	Method No.	4 SN 10/27/16 NCASF 99-02
Sample Location	Line Former	Train No.	1
Setup Technician	SN	Cleanup Technician	SN

Back-Half Catch

	Impinger 1	Impinger 2	Impinger 3	Impinger 4	Impinger 5	Impinger 6	Impinger 7
Final Weights (grams)							
Initial Weight (grams)							
Net Gain (grams)							

Total Impinger Catch (grams)

Back Half Wash Solution(s)

Impinger Charge Solution(s)

Post-test Impinger solution appearance:

Method 202 Purge Temp (F)	% Silica Gel Spent
0 mins	
10 mins	
20 mins	
30 mins	
40 mins	
50 mins	
60 mins	

Filter Identifications and Recoveries

	In-Stack Filter	Hot Box Filter	Method 202
Filter #			

Front Half Wash solution(s)

Filter Notes:

Sample Bottles

	Front Half			Back- Half			
	Container #	Container #	Container #	Container # 1	Container #	Container #	Container #
Description/ Contents				DI H_2O			
Sample ID				Line Former -3			
Final Wt				244.5			
Tare Wt				170.6			
Net Wash Wt				73.9			

FIELD DATA SHEET 1
Sampling Velocity Traverse Points

FORM# GSC-RM001-001
REV 2015-02, EFF 7/7/15

Client/Plant Name: Nexar Job#: 160282

City/State: White Swan, WA Date/Time: 10/27/16

Test Location: Dryer Vent Personnel: SN/AK/TH/JA

Port Inside Diameter	3 inches		
Distance from Far Wall to Outside of Port	50 inches		
Nipple Length and/or Wall Thickness	4 inches		
Stack/Duct (√) Blue Print ( )	Measured (√)		
Depth/Diameter (>12 in. ?)	46 inches		
Width (if rectangular)	—		
Equiv. Diameter (if rect.) $D_e = 2\,D\,W/(D + W)$	—		
Area (A) (>113in.²?) $A = \pi D^2/4$ or $D\,W$	11.54 ft²		
Distance From Flow Disturbance to Port	Distance	D_e	No. Pts*
Upstream (≥ 0.5 D_e?)	25	6.54	16
Downstream (≥ 2.0 D_e?)	95	2.1	16
Cyclonic Flow Checked?	(Yes)	No	NA
Rectangular Matrix	—		

*Circle larger of two

Pt.	%Duct Depth	Dist from Inside Wall*	Dist from Oustide of Port
1	3.2	1.5	5.5
2	10.5	4.8	8.8
3	19.4	~~12.2~~ 8.9	12.9
4	32.3	14.9	18.9
5	67.7	31.1	35.1
6	80.6	37.1	41.1
7	89.5	41.2	45.2
8	96.5	44.5	48.5
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			

*Do not place closer to stack walls than:
1.0 in. for stack dia > 24 in.
0.5 in. for stack dia 12 to ≤ 24 in.

Sketch of Location: In the space above, sketch a flow diagram of the test location; show the distance from the ports to the distrubances before & after. Sketch the cross-sectional area; show sampling port locations. In horizontal ducts, check for dust buildups & measure or estimate the depth.

QA/QC Check
Completeness ✓ Legibility ✓ Accuracy ✓ Specifications ✓ Reasonableness ✓

Checked by: _____ Personnel (Signature/Date) _____ Team Leader (Signature/Date)

GOLDEN SPECIALTY

CYCLONIC FLOW DETERMINATION

FORM # GSC-RM001-003
REV 2015-01, EFF 3/19/15

Plant Name Nemco
Job No. 160282
City/State White Swan, WA
Date
Test Loc. Dryer Vent
Personnel SN/AK/JA/JH
Barometric Pres. (Pbar) 28.90 In. Hg
Static Pres. (Pg) ~~2.1~~ 0.81 in. H_2O (SN 10/22)
Pitot/Orfices ID TIM 5-1
Pitot Coef. (C_p) 0.84
Pres. Gauge Set ID CCI-1
Thermocouple ID TC-TIM-5-1
Duct/Stack Dimensions 46

Pitot Tube Leak Checks	Ok ?	in H_2O
Pre-test (-)	✓	4
Pre-test (+)	✓	4
Post-test (-)	✓	4
Post-test (+)	✓	4

CYCLONIC FLOW CHECK

Start - Finish Times
14:12 - 14:25

Note: Yaw angle average is sum of the absolute values divided by the number of measurements, and must be <20°.

Test Pt.	Yaw Angle. °ø
A-1	0
A-2	0
A-3	0
A-4	5
A-5	5
A-6	10
A-7	0
A-8	0
B-1	0
B-2	0
B-3	0
B-4	0
B-5	0
B-6	0
B-7	0
B-8	0
Avg.	1.25

GOLDEN SPECIALTY

USEPA Method 2/4 Field Data Sheet

Page 1 of ____

Test Date:	10/27/16	Filter Number:	—
Project Number:	160282	Nozzle ID:	—
Location:	Neuco	Nozzle Dia. (in.):	—
Process:	Dryer	Meter Box ID:	CLJ-1
Source Name:	Dryer	ΔH@:	1.589
Operators:	JA/AK	Meter Y:	1.010
		P_{bar} (in. H_g):	28.90
		P_{static} (in. H_2O):	0.81
Run Number:	1		

Train ID	—
Hot Box ID	—
Pitot Coeff:	0.84
Probe/Pitot ID:	TDA-S-1
Stack TC ID:	TG TIn-S-1
Probe TC ID:	—
Effective Length:	5 ft
Liner (SS, glass):	—
Stack Diam/LxW	41 ends

Leak Checks

Pitot Line	OK ?	in H2O ?
Pre-test (-):	✓	4
Pre-test (+):	✓	4
Post-test (-):	✓	4
Post-test (+):	✓	4

Sample Train	(Pretest)	(Post test)
Leak Rate:	0.015	0.015
Vac:	-15	-15
If needed:	(Mid)	(Mid)
Leak Rate:		
Vac:		

Traverse Point	Clock Time	Elapsed Time	ΔP (in. H_2O)	Meter Conditions ΔH	Meter Conditions Meter Volume	Temperature (°F) Stack	Temperature (°F) Probe	Temperature (°F) Oven	Meter (°F) In	Meter (°F) Out	Imp Out (°F)	Vac (in. Hg)		
A1	14:32	0	1.7	1.5	56.136	139	—	—	58	54	55	-5		
2	14:42	10	1.7	1.5	62.93	139	—	—	58	55	56	-6		
3	14:52	20	1.7	1.5	69.59	139	—	—	58	56	58	-6		
4	15:02	30	1.7	1.5	76.23	139	—	—	61	56	58	-7		
5	15:12	40	1.7	1.5	82.64	139	—	—	61	57	60	-7		
6	15:22	50	1.7	1.5	89.44	139	—	—	62	58	63	-7		
7	15:32	60	1.7	—	96.559	139	—	—	End	Test	—	—		
8			1.7			139								
B1			1.7			139								
2			1.7			139								
3			1.7			139								
4			1.7			139								
5			1.7			139								
6			1.7			139								
7			1.7			139								
8			1.7			139								

GOLDEN SPECIALTY

Plant	NEUCOR	Date	10/27/16
Run Number	1	Method No.	4
Sample Location	DRYER VENT	Train No.	1
Setup Technician	SN	Cleanup Technician	SN

Back-Half Catch

	Impinger 1	Impinger 2	Impinger 3	Impinger 4	Impinger 5	Impinger 6	Impinger 7
Final Weights (grams)	709.9	798.6	544.2	888.3			
Initial Weight (grams)	639.0	799.7	544.8	874.8			
Net Gain (grams)	70.9	-1.1	-0.6	13.5			

Method 202	% Silica Gel Spent
Purge Temp (F)	04.
0 mins	
10 mins	
20 mins	
30 mins	50%
40 mins	
50 mins	
60 mins	

Total Impinger Catch (grams) 82.7

Back Half Wash Solution(s) —

Impinger Charge Solution(s) DI H_2O

Post-test Impinger solution appearance: Clear

Filter Identifications and Recoveries

	In-Stack Filter	Hot Box Filter	Method 202
Filter #			

Filter Notes:

Front Half Wash solution(s)

Sample Bottles

	Front Half			Back- Half			
	Container #	Container #	Container #	Container #	Container #	Container #	Container #
Description/ Contents							
Sample ID							
Final Wt							
Tare Wt							
Net Wash Wt							

GOLDEN SPECIALTY

USEPA Method 2/4 Field Data Sheet

Test Date:	10/27/16	Filter Number:	—
Project Number:	160282	Nozzle ID:	—
Location:	Nevcor	Nozzle Dia. (in.):	—
Process:	Dryer	Meter Box ID:	CCI-1
Source Name:	Dryer	ΔH@:	1.586
Operators:	JA/AK	Meter Y:	1.010
		P_{bar} (in. H_g):	28.90
		P_{static} (in. H_2O):	0.01
Run Number:	2		

Train ID	—
Hot Box ID	—
Pitot Coeff:	0.84
Probe/Pitot ID:	TIm-S-1
Stack TC ID:	TC-TIm-S-1
Probe TC ID:	—
Effective Length:	5 ft
Liner (SS, glass):	—
Stack Diam/LxW	46 round

Leak Checks

Pitot Line	OK ?	in H2O ?
Pre-test (-):	✓	4
Pre-test (+):	✓	4
Post-test (-):	✓	4
Post-test (+):	✓	4

Sample Train	(Pretest)	(Post test)
Leak Rate:	0.00	0.00
Vac:	-15	1"
If needed: (Mid)		(Mid)
Leak Rate:		
Vac:		

Traverse Point	Clock Time	Elapsed Time	ΔP (in. H_2O)	Meter Conditions ΔH	Meter Conditions Meter Volume	Temperature (°F) Stack	Temperature (°F) Probe	Temperature (°F) Oven	Meter (°F) In	Meter (°F) Out	Imp Out (°F)	Vac (in. Hg)		
A1	16:20	0	1.7	1.5	96.798	140			61	61	57	7		
2	16:30	10	1.7	1.5	103.66	140			63	62	58	7		
3	16:40	20	1.7	1.5	110.56	140			65	63	60	7		
4	16:50	30	1.7	1.5	117.43	140			65	63	62	7		
5	17:00	40	1.7	1.5	124.29	140			69	63	64	7		
6	17:10	50	1.7	1.5	131.12	140			65	63	65	7		
7	17:20	60	1.7	—	137.936	140			— End Run					
8			1.7			140								
B1			1.7			140								
2			1.7			140								
3			1.7			140								
4			1.7			140								
5			1.7			140								
6			1.7			140								
7			1.7			140								
8			1.7			140								
						140								

GOLDEN SPECIALTY

Plant	NEUCOR	Date	10/27/16
Run Number	2	Method No.	4
Sample Location	DRYER VENT	Train No.	1
Setup Technician	SN	Cleanup Technician	SN

Back-Half Catch

	Impinger 1	Impinger 2	Impinger 3	Impinger 4	Impinger 5	Impinger 6	Impinger 7
Final Weights (grams)	828.4	743.6	631.4	855.2			
Initial Weight (grams)	753.7	742.0	630.1	842.4			
Net Gain (grams)	74.7	1.6	1.3	12.8			

Method 202 Purge Temp (F)	% Silica Gel Spent
0 mins	0.
10 mins	
20 mins	
30 mins	50%
40 mins	
50 mins	
60 mins	

Total Impinger Catch (grams): 90.4

Back Half Wash Solution(s): —

Impinger Charge Solution(s): DI H_2O

Post-test Impinger solution appearance: Clear

Filter Identifications and Recoveries

	In-Stack Filter	Hot Box Filter	Method 202
Filter #			

Filter Notes:

Front Half Wash solution(s)

Sample Bottles

	Front Half			Back- Half			
	Container #	Container #	Container #	Container #	Container #	Container #	Container #
Description/ Contents							
Sample ID							
Final Wt							
Tare Wt							
Net Wash Wt							

GOLDEN SPECIALTY

USEPA Method 2/4 Field Data Sheet

Test Date:	10/27/16	Filter Number:	—	Train ID	—
Project Number:	160282	Nozzle ID:	—	Hot Box ID	—
Location:	Nevcor	Nozzle Dia. (in.):	—	Pitot Coeff:	0.84
Process:	Dryer	Meter Box ID:	CCI-1	Probe/Pitot ID:	TIM-5-1
Source Name:	Dryer	ΔH@:	1.589	Stack TC ID:	TC-TIM-5-1
Operators:	JA/MK	Meter Y:	1.010	Probe TC ID:	—
		P_{bar} (in. H_g):	28.90	Effective Length:	5 ft
		P_{static} (in. H_2O):	0.81	Liner (SS, glass):	—
Run Number:	3			Stack Diam/LxW	46 inch

Leak Checks

Pitot Line	OK ?	in H2O ?
Pre-test (-):	✓	4
Pre-test (+):	✓	4
Post-test (-):	✓	4
Post-test (+):	✓	4

Sample Train	(Pretest)	(Post test)
Leak Rate:	0.010	0.010
Vac:	-15	-10
If needed:	(Mid)	(Mid)
Leak Rate:		
Vac:		

Traverse Point	Clock Time	Elapsed Time	ΔP (in. H_2O)	Meter Conditions ΔH	Meter Conditions Meter Volume	Temperature (°F) Stack	Temperature (°F) Probe	Temperature (°F) Oven	Meter (°F) In	Meter (°F) Out	Imp Out (°F)	Vac (in. Hg)		
A1	17:50	0	1.7	1.5	138.216	139			56	59	55	7		
2	18:00	10	1.7	1.5	144.84	139			57	56	53	7		
3	18:10	20	1.7	1.5	151.56	139			58	56	57	7		
4	18:20	30	1.7	1.5	158.22	139			57	57	58	7		
5	18:30	40	1.7	1.5	164.85	139			56	54	58	7		
6	18:40	50	1.7	1.5	171.43	139			56	54	58	7		
7	18:50	60	1.7	—	178.063	139			—	End	Run	—		
8			1.7			139								
B1			1.7			139								
2			1.7			139								
3			1.7			139								
4			1.7			139								
5			1.7			139								
6			1.7			139								
7			1.7			139								
8			1.7			139								

SPECIALTY

Plant	NEUCOR	Date	6/27/16
Run Number	3	Method No.	4
Sample Location	DRYER VENT	Train No.	1
Setup Technician	SN	Cleanup Technician	SN

Back-Half Catch

	Impinger 1	Impinger 2	Impinger 3	Impinger 4	Impinger 5	Impinger 6	Impinger 7
Final Weights (grams)	785.0	799.4	545.6	843.3			
Initial Weight (grams)	709.9	798.6	544.2	~~8[illegible]~~ 832.2			
Net Gain (grams)	75.1	0.8	1.4	11.1			

Method 202 Purge Temp (F)	% Silica Gel Spent
0 mins	50%
10 mins	
20 mins	90%
30 mins	
40 mins	
50 mins	
60 mins	

Total Impinger Catch (grams): 88.4

Back Half Wash Solution(s):

Impinger Charge Solution(s): DIH_2O

Post-test Impinger solution appearance: Clear.

Filter Identifications and Recoveries

	In-Stack Filter	Hot Box Filter	Method 202
Filter #			

Filter Notes:

Front Half Wash solution(s)

Sample Bottles

	Front Half			Back- Half			
	Container #	Container #	Container #	Container #	Container #	Container #	Container #
Description/ Contents							
Sample ID							
Final Wt							
Tare Wt							
Net Wash Wt							

GOLDEN SPECIALTY
3855 South 500 West, Suite A
Salt Lake City, Utah 84115
801 269 0550

SM 1-127

Method ~~30B~~ Sampling Train

NCASI 99.02

Date 10/27/16	Operators JH / AK	Meter Box Number	VOST - 1
Plant Name Nexco			
Unit/Location Dryer		Meter Box Gamma	1.0134
Operating Load —	Run # 1	Pretest Leak Check	0.000 @ 10"
Barometric Pressure (Stack Elevation)	28.90	Posttest Leak Check	0.00 @ 5"

Tube Number — Tube Number —

Ambients

Traverse Point Number	Clock Time	Elapsed Time (minutes)	Gas Meter Reading (Liters)	Rotometer Reading (LPM)	Vacuum (" of Hg)	Temperatures Stack F	Meter In F	Meter Out F	Probe F	~~Condenser~~ Filter F
	1431	0	597.142	—	1		56	56	250	250
	1441	10	597.530	—	1		56	57	250	250
	1451	20	597.9.37	—	1		58	58	250	250
	1501	30	598.38	—	1		59	59	250	250
	1511	40	598.40	—	1		61	62	250	250
	1521	50	599.34	—	1		62	62	250	250
	1531	60	599.335	—		End test				

SM 1-127

Sample rate for VOST = 1 liter per minute, Sample rate for SLO-VOST = 0.5 liters per minute.
Maximum sample volume = 20 liters
Leak rate < 0.02 liter per minute (VOST) and < 0.01 liter per minute (SLO-VOST)
Probe temperature > or = 266 F
Condenser temp < or = 68 F

GOLDEN SPECIALTY
3855 South 500 West, Suite A
Salt Lake City, Utah 84115
801 269 0550

SN 1-1-27

Method ~~30B~~ Sampling Train

NCASI 99.02

Date 10/27/16	Operators JA/AK	Meter Box Number VOST-2	
Plant Name Neuces			
Unit/Location Dryer		Meter Box Gamma ~~1.0161~~ SN 10/27/16	0.9187
Operating Load	Run # 1 (spike)	Pretest Leak Check 0.00 @ 10"	
Barometric Pressure (Stack Elevation) 28.90		Posttest Leak Check 0.00 @ 5"	

Tube Number — Tube Number —

Traverse Point Number	Clock Time	Elapsed Time (minutes)	Gas Meter Reading (Liters)	Rotometer Reading (LPM)	Vacuum (" of Hg)	Temperatures Stack F	Meter In F	Meter Out F	Probe F	~~Condenser~~ Filter F
	14:31	0	2339.45	—	1	—	54	53	250	250
	14:41	10	2343.55	—	1	—	54	54	250	250
	14:51	20	2347.52	—	1	—	57	56	250	250
	15:01	30	2351.75	—	1	—	59	59	250	250
	15:11	40	2355.48	—	1	—	59	61	250	250
	15:21	50	2359.46	—	1	—	62	63	250	250
	15:31	60	2363.44	—	—	End Test	—	—	—	—

SN 10/27

Sample rate for VOST = 1 liter per minute, Sample rate for SLO-VOST = 0.5 liters per minute.
Maximum sample volume = 20 liters
Leak rate < 0.02 liter per minute (VOST) and < 0.01 liter per minute (SLO-VOST)
Probe temperature > or = 266 F
Condenser temp < or = 68 F

SPECIALTY

Plant	NUCOR	Date	1-27/16
Run Number	1	Method No.	NCASI-99.02
Sample Location	DRYER VENT	Train No.	1
Setup Technician	SN	Cleanup Technician	SN

Back-Half Catch

	Impinger 1	Impinger 2	Impinger 3	Impinger 4	Impinger 5	Impinger 6	Impinger 7
Final Weights (grams)							
Initial Weight (grams)							
Net Gain (grams)							

Method 202 Purge Temp (F)	% Silica Gel Spent
0 mins	
10 mins	
20 mins	
30 mins	
40 mins	
50 mins	
60 mins	

Total Impinger Catch (grams)

Back Half Wash Solution(s)

Impinger Charge Solution(s)

Post-test Impinger solution appearance:

Filter Identifications and Recoveries

	In-Stack Filter	Hot Box Filter	Method 202
Filter #			

Filter Notes:

Front Half Wash solution(s)

Sample Bottles

	Front Half			Back- Half			
	Container #	Container #	Container #	Container # 1	Container # 2	Container #	Container #
Description/ Contents				DI H_2O	DI H_2O		
Sample ID				DRYER-1	~~DRYER-1DUP~~ SN 1-27/16 DRYER-1SPIKE		
Final Wt				245.4	247.6		
Tare Wt				170.0	170.4		
Net Wash Wt				75.4	77.2		

GOLDEN SPECIALTY
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Salt Lake City, Utah 84115
801 269 0550

SV 1/27

Method ~~30B~~ Sampling Train

NCASI 99.02

Date 10/27/16	Operators JA/AK	Meter Box Number VOST-1	
Plant Name Nevcor			
Unit/Location Dryer		Meter Box Gamma 1.0134	
Operating Load	Run # 2	Pretest Leak Check 0.00 @ 10"	
Barometric Pressure (Stack Elevation) 28.92		Posttest Leak Check 0.00 @ 5"	

Tube Number ____ Tube Number ____ 11/30/16

Traverse Point Number	Clock Time	Elapsed Time (minutes)	Gas Meter Reading (Liters)	Rotometer Reading (LPM)	Vacuum (" of Hg)	Temperatures Stack F	Meter In F	Meter Out F	Probe F	~~Condenser~~ Filter F
	1620	0	5995.585	—	1	—	64	62	250	250
	1630	10	5999.60	—	1	—	66	67	250	250
	1640	20	6003.49	—	1	—	67	68	250	250
	1650	30	6007.58	—	1	—	68	69	250	250
	1700	40	6011.55	—	1	—	68	69	250	250
	1710	50	6015.54	—	1	—	68	70	250	250
	1720	60	6019.540	—	—	End time	—	—	—	—

SV 1/27

Sample rate for VOST = 1 liter per minute, Sample rate for SLO-VOST = 0.5 liters per minute.
Maximum sample volume = 20 liters
Leak rate < 0.02 liter per minute (VOST) and < 0.01 liter per minute (SLO-VOST)
Probe temperature > or = 266 F
Condenser temp < or = 68 F

SPECIALTY

Plant	NEUCOR	Date	10/27/16
Run Number	2	Method No.	NCASI 99 02
Sample Location	DRYER VENT	Train No.	2
Setup Technician	SN	Cleanup Technician	SN

Back-Half Catch

	Impinger 1	Impinger 2	Impinger 3	Impinger 4	Impinger 5	Impinger 6	Impinger 7
Final Weights (grams)							
Initial Weight (grams)							
Net Gain (grams)							

Method 202	% Silica Gel Spent
Purge Temp (F)	
0 mins	
10 mins	
20 mins	
30 mins	
40 mins	
~~50 mins~~	
60 mins	

Total Impinger Catch (grams)

Back Half Wash Solution(s)

Impinger Charge Solution(s)

Post-test Impinger solution appearance:

Filter Identifications and Recoveries

	In-Stack Filter	Hot Box Filter	Method 202
Filter #			

Filter Notes:

Front Half Wash solution(s)

Sample Bottles

	Front Half			Back- Half			
	Container #	Container #	Container #	Container # 1	Container #	Container #	Container #
Description/ Contents				DI H_2O			
Sample ID				DRYE-2			
Final Wt				243.0			
Tare Wt				170.6			
Net Wash Wt				72.4			

GOLDEN SPECIALTY
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801 269 0550

SN 1-127

Method ~~30B~~ Sampling Train

NCASI 99.02

Date 10/27/16	Operators JA/AK	Meter Box Number VOST-2	
Plant Name Nevcor			
Unit/Location Dryer		Meter Box Gamma ~~1.0161~~ SN 1-127 0.9187	
Operating Load	Run # 3	Pretest Leak Check 0.00 @ 10"	
Barometric Pressure (Stack Elevation) 28.90		Posttest Leak Check 0.00 @ 5"	

Tube Number ✓ Tube Number ✓ @ 10/30/16

Traverse Point Number	Clock Time	Elapsed Time (minutes)	Gas Meter Reading (Liters)	Rotometer Reading (LPM)	Vacuum (" of Hg)	Temperatures: Stack F	Meter In F	Meter Out F	Probe F	Condenser F	Filter F
Single Pt	17:49	0	2365.88		1	✓	57	59	250		250
	17:59	10	2367.84		1	✓	54	57	250		250
	18:09	20	2371.86		1	✓	58	58	250		250
	18:19	30	2375.86		1	✓	57	58	250		250
	18:29	40	2379.75		1	✓ JA 10/27	57	58	250		250
	18:39	50	2383.99		1	✓	57	57	250		250
	18:49	60	2387.89			End Run					

Sample rate for VOST = 1 liter per minute, Sample rate for SLO-VOST = 0.5 liters per minute.
Maximum sample volume = 20 liters
Leak rate < 0.02 liter per minute (VOST) and < 0.01 liter per minute (SLO-VOST)
Probe temperature > or = 266 F
Condenser temp < or = 68 F

GOLDEN SPECIALTY
3855 South 500 West, Suite A
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801 269 0550

SK 1-12-7

Method ~~30B~~ Sampling Train

NCASI 99.02

Date 10/27/16	Operators JH/AK	Meter Box Number	VOST - 1
Plant Name Neucor			
Unit/Location Dryer		Meter Box Gamma	1.0134
Operating Load	Run # 3 Duplicate	Pretest Leak Check	0.000 @ 10"
Barometric Pressure (Stack Elevation)	28.90	Posttest Leak Check	0.000 @ 5"

a 11/30/16

Tube Number _____ Tube Number _____

Traverse Point Number	Clock Time	Elapsed Time (minutes)	Gas Meter Reading (Liters)	Rotometer Reading (LPM)	Vacuum (" of Hg)	Temperatures Stack F	Meter In F	Meter Out F	Probe F	Condenser F	Filter F
	1749	0	6020.32	—	2	—	69	65	250	—	250
	1759	10	6024.22	—	1	—	62	63	250	—	250
	1809	20	6028.29	—	0	—	63	62	250	—	250
	1819	30	6032.31	—	0	—	61	59	250	—	250
	1829	40	6036.25	—	0	—	63	61	250	—	250
	1839	50	6040.26	—	0	—	60	60	250	—	250
	1849	60	6044.280	—	—	End test	—	—			

Sample rate for VOST = 1 liter per minute, Sample rate for SLO-VOST = 0.5 liters per minute.
Maximum sample volume = 20 liters
Leak rate < 0.02 liter per minute (VOST) and < 0.01 liter per minute (SLO-VOST)
Probe temperature > or = 266 F
Condenser temp < or = 68 F

SPECIALTY

Plant	NEUCOR	Date	1-12-7/16
Run Number	3	Method No.	NCASI 99.02
Sample Location	DRYER VENT	Train No.	2
Setup Technician	SN	Cleanup Technician	SN

Back-Half Catch

	Impinger 1	Impinger 2	Impinger 3	Impinger 4	Impinger 5	Impinger 6	Impinger 7
Final Weights (grams)							
Initial Weight (grams)							
Net Gain (grams)							

Method 202 Purge Temp (F)	% Silica Gel Spent
0 mins	
10 mins	
20 mins	
30 mins	
40 mins	
50 mins	
60 mins	

Total Impinger Catch (grams)

Back Half Wash Solution(s)

Impinger Charge Solution(s)

Post-test Impinger solution appearance:

Filter Identifications and Recoveries

	In-Stack Filter	Hot Box Filter	Method 202
Filter #			

Filter Notes:

Front Half Wash solution(s)

Sample Bottles

	Front Half			Back- Half			
	Container #	Container #	Container #	Container # 1	Container # 2	Container #	Container #
Description/ Contents				DI H_2O	DI H_2O		
Sample ID				DRYER-3	DRYER-3 DUP		
Final Wt				247.6	245.9		
Tare Wt				172.3	171.0		
Net Wash Wt				75.3	74.9		

GOLDEN SPECIALTY

FORM GSC-FIELD-005
REV 2015-01, EFF 9/15/15

Daily Project Log

Project ID: 16282	Test Dates From: 10/25/16	To: 10/27/16
Plant: Neenah	Trailer#: Golden-1 (T2)	Project Manager: SN
Source: Press Vent, Line Former, Dryer Vent	Test Team Members: SN/AK/JH/JA	Facility Contact: Ed Surdyk
Location: ~~Outside Suwan, GA~~		Regulatory Observer: —

This form is specifically for use to record any activities or conditions that occur during a project that could possibly have an effect on the testing or the results recorded. It is to be completed as needed by the Project Manager for each project performed.

Date/Time	Daily Site Activities and/or Conditions that May have an Effect on the Testing or Results
10/25/16	10:36-12:43 - Press Vent Particulate Run 1
10/25/16	14:30-15:42, 18:20-19:18 - Press Vent Particulate Run 2
	Unit down from 15:42-18:20
10/26/16	8:11-10:21 - Press Vent Particulate Run 3
10/26/16	12:25-13:25 - HAPS Press Vent Run 1
10/26/16	14:30-14:40; 14:57-15:47 - HAPS Press Vent Run 2
	Unit down from 14:40-14:57
10/26/16	16:28-17:28 - HAPS Press Vent Run 3
10/27/16	8:29-8:31, 9:01-10:03 - HAPS Line Former Run 1
	8:31-9:01 - Unit down
10/27/16	10:26-11:26 - HAPS Line Former Run 2
10/27/16	11:47-12:47 - HAPS Line Former Run 3
10/27/16	14:31-15:31 - HAPS Dryer Vent Run 1
Technical Director Approval for Deviations:	

GOLDEN SPECIALTY

FORM GSC-FIELD-005
REV 2015-01, EFF 9/15/15

Daily Project Log

Project ID: 160282	Test Dates From: 10/25/16	To: 10/27/16
Plant: Nexcor	Trailer#: Golden-1 (T2)	Project Manager: SA
Source: Press Vent, Line Former, Dryer Vent	Test Team Members: SA/AK/JH/JA	Facility Contact: Ed Surdyk
Location: White Swan, WA		Regulatory Observer: —

This form is specifically for use to record any activities or conditions that occur during a project that could possibly have an effect on the testing or the results recorded. It is to be completed as needed by the Project Manager for each project performed.

Date/Time	Daily Site Activities and/or Conditions that May have an Effect on the Testing or Results
10/27/16	16:20-17:20 - HAPS Dryer Vent Run 2
10/27/16	17:49-18:49 - HAPS Dryer Vent Run 3
RM O_2/CO_2	Clock was one hour ahead of actual time (all
Wet chemistry	methods times noted on data sheet)
Technical Director Approval for Deviations:	

GOLDEN SPECIALTY

Operating Discipline Checklist

Project ID: 160282 Plant: Nelson Source: Press Vent, Dryer, Line Former. Description:	Test Date: 10/25/16 - 10/27/16 Team Members: SN/JH/JA/AK Trailer Unit: Golden-1 (T2)

	Item to Check	(Initials Required)
1	Checklist for GOLDEN Trailer Set-Up (Form #GSC-WP001-001)	SN
2	EPA Protocol 1 Gases Used	SN
3	Fully Redundant Sampling System System 1 ✓ System 2 ___	SN
4	Stratification Test Conducted an Documented Start time: Finish Time: File Name: NA	
5	Documentation of Probe Geometry and Location (Form #GSC-WP007-003)	SN
6	Measurement of Ambient Conditions: Barometer: 29.09 Rel.Humidity: 90% Temperature: 60 °F	SN
7	Flanged Sample Probe or Port Closures	SN
8	Heated Sample Lines Set Temperature: 250 °F Measured Temperature: 250 °F	SN
9	Grounding and electrical requirements	SN
10	Data Exclusion Log (Form # GSC-WP007-002) NA	-
11	Staggered Calibrations	SN
12	Data Storage and Formatting: Headers on and checked? ✓ Yes ___ No Data Logging ON? ✓ Yes ___ No	SN
13	Gas Conditioning System Temperature System 1: 4C System 2: 4C	SN
14	Reasons for any exceptions:	SN

Signature of Person Recording Information:	[signature]	Date:	10/25/16
Approval of Client to Proceed with Testing:		Date:	

Form # GSC-WP007-004
REV 2010-01, EFF 11/1/10

SPECIALTY

Plant	Nucor	Date	10/26/14
Run Number	Blanks	Method No.	NCASI-99-02
Sample Location	Blanks - pre location	Train No.	—
Setup Technician	SN	Cleanup Technician	SN

Back-Half Catch

	Impinger 1	Impinger 2	Impinger 3	Impinger 4	Impinger 5	Impinger 6	Impinger 7
Final Weights (grams)							
Initial Weight (grams)							
Net Gain (grams)							

Method 202 Purge Temp (F)	% Silica Gel Spent
0 mins	
10 mins	
20 mins	
30 mins	
40 mins	
50 mins	
60 mins	

Total Impinger Catch (grams)

Back Half Wash Solution(s)

Impinger Charge Solution(s)

Post-test Impinger solution appearance:

Filter Identifications and Recoveries

	In-Stack Filter	Hot Box Filter	Method 202
Filter #			

Filter Notes:

Front Half Wash solution(s)

Sample Bottles

	Front Half			Back- Half			
	Container # SN 10/26/14	Container # 2	Container #	Container # 1	Container # 2	Container # 3	Container # 4
Description/ Contents				DI H_2O	DI H_2O	DI H_2O	DI H_2O
Sample ID				Field Blank	Equipment Blank	Train Spike	Field Spike - TS
Final Wt				243.7	244.5	246.8	249.2
Tare Wt				164.7	169.7	169.6	169.5
Net Wash Wt				79.0	74.8	77.2	79.7

GOLDEN SPECIALTY

Plant	NUCOR	Date	10/27/16
Run Number	Blanks	Method No.	NCASI- 99.02
Sample Location	Acc	Train No.	—
Setup Technician	SN	Cleanup Technician	SN

Back-Half Catch

	Impinger 1	Impinger 2	Impinger 3	Impinger 4	Impinger 5	Impinger 6	Impinger 7
Final Weights (grams)							
Initial Weight (grams)							
Net Gain (grams)							

Method 202 Purge Temp (F)	% Silica Gel Spent
0 mins	
10 mins	
20 mins	
30 mins	
40 mins	
50 mins	
60 mins	

Total Impinger Catch (grams)

Back Half Wash Solution(s)

Impinger Charge Solution(s)

Post-test Impinger solution appearance:

Filter Identifications and Recoveries

	In-Stack Filter	Hot Box Filter	Method 202
Filter #			

Filter Notes:

Front Half Wash solution(s)

Sample Bottles

	Front Half			Back- Half			
	Container #	Container #	Container #	Container # 1	Container # 2	Container # 3	Container #
Description/ Contents				DI H_2O	DI H_2O	DI H_2O	
Sample ID				Field Spike -Press Vent	Field Spike - Line Forma	Field Spike - Dryer Vent	
Final Wt				248.8	246.7	246.5	
Tare Wt				172.0	170.4	170.5	
Net Wash Wt				76.8	76.3	76	

Paula Metz

From: Shamit Nakra
Sent: Tuesday, October 18, 2016 5:42 PM
To: Hedgpeth.Zach@epa.gov
Cc: keenan.john@epa.gov; Hardesty.Doug@epa.gov; Austin Keough; esanchey@yakama.com; Ron McCulloch; Paula Metz; Ed Surdyk
Subject: Emission Testing at Neucor Panels

Follow Up Flag: Follow up
Flag Status: Completed

All,
Golden Specialty was contracted by Neucor Inc. (Neucor, White Swan, Washington) to measure emissions from the Press Vent #1, Dryer Vent #1, and Line Former #1. The testing program consists of measurement of emissions of six regulated hazardous air pollutant (acetaldehyde, acrolein, phenol, formaldehyde, methanol, propionaldehyde) species from the previously mentioned sources. The program also included measuring total particulate emissions and evaluating of opacity from Press Vent#1. The testing is scheduled for week on 10/24. As required, the test plan for above mentioned testing program was submitted 30 days in advance.

According to the test plan, we were planning to use Method 320 to measure 6 hazardous air pollutant (HAPs) species from all three sources. However, due to some logistic issues, we will not be able to use Method 320 and will be using NCASI Method 99.02 instead to measure HAPs emissions from all three sources. This is one of the approved methods to measure HAPs emissions per the Neucor Pemit (MNSR Permit Number: R10TNSR00200).

Since all HAPs being measured are highly soluble in water, we will be using only the impinger analysis technique.

Please feel free to contact me if there are any issues or concerns with change in methodology to measure HAPs emissions.

Thanks,

Shamit Nakra, PhD, QI
Project Manager
Southwest and Northwest Region
Phone: 385-282-0291

GOLDEN SPECIALTY

Air Quality Test Report

APPENDIX E – Reference Method Data

Method 1 & 2
Data Sheet

Method 1 and 2 Data Sheet

Plant	Neucor, Inc	Time	Date 10/25/2016	Job #	160282
Address	White Swan, WA	Wetbulb temp	Md	$\%CO_2$	
Location	Press Vent #1 (East Vent)	% moisture	Ms	$\%O_2$	
Personnel	SN/AK/JA/JH			Fo	

Distance from Far Wall to Outside of Port, inches		50.0
Width (if Rectangular)		
Nipple Length and/or Wall Thickness, inches		4.0
Diameter, inches		46.0
Equivalent Diameter (only when rectangular)		
Area in square feet		11.54
Straight Distance before sampling location, inches		95
Number of Diameters Before Location*		2.1
Straight Distance after sampling location, inches		25
Number of Diameters After Location*		0.5
Enter "P" for Particulate or "V" for velocity		P
Minimum Number of Total Points		24
Number of Total Points Chosen	OK	24
Number of Ports	OK	2
Number of Points per Port	OK	12

Draw sampling location, plan & top view.

Points	% Duct Depth	Distance from Outside of Port
A-1	2.1%	5.0
A-2	6.7%	7.1
A-3	11.8%	9.4
A-4	17.7%	12.1
A-5	25.0%	15.5
A-6	35.6%	20.4
A-7	64.4%	33.6
A-8	75.0%	38.5
A-9	82.3%	41.9
A-10	88.2%	44.6
A-11	93.3%	46.9
A-12	97.9%	49.0
		Average

Stack Yaw & Velocity Data			
Yaw Angle Degrees	ΔP inch H_2O	Temp °F	Velocity Feet/sec

dscfm

QA/QC Check
Completeness ____ Legibility ____ Accuracy ____ Specifications ____ Reasonableness ____
Checked By: ____ ____
Reviewer (Signature/Date) Team Leader (Signature/Date)