

# CONDEA Vista Chemical

Aberdeen, Mississippi

## Air Emissions Test Protocol

### Multiple Source Compliance Test for Particulate Emissions

| <b>(1) Facility Information</b>                                                                          |                                                                                                                                                                     |
|----------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>a. Facility Name.</b>                                                                                 | CONDEA Vista Chemical<br>Post Office Box 91<br>New Highway 25<br>Aberdeen, Mississippi 39730-0091                                                                   |
| <b>b. Facility contact person.</b>                                                                       | Mr. Kenny Akins                                                                                                                                                     |
| <b>c. Telephone number.</b>                                                                              | 601/ 369-3637                                                                                                                                                       |
| <b>d. Facility permit number.</b>                                                                        | 1840-00014                                                                                                                                                          |
| <b>e. Facility source identification number.</b>                                                         | MSD007031230                                                                                                                                                        |
| <b>f. Proposed test date.</b>                                                                            | November 1-5, 1999                                                                                                                                                  |
| <b>g. Source test company.</b>                                                                           | Entec Services, Inc.<br>25 Commerce Ave., Suite 104<br>Hueytown, Alabama 35023                                                                                      |
| <b>h. Analytical laboratory to perform analysis.</b>                                                     | Entec Services, Inc.<br>25 Commerce Ave., Suite 104<br>Hueytown, Alabama 35023                                                                                      |
| <b>(2) Test Objectives</b>                                                                               |                                                                                                                                                                     |
| <b>a. Purpose of the tests.</b>                                                                          | To demonstrate compliance for particulate emissions.                                                                                                                |
| <b>b. Citation of any applicable State or Federal regulation or permit condition requiring the test.</b> | Permit 1840-00014 condition Section 5.B.7 specifies that the source shall demonstrate compliance for PM (Method 5) according to the test protocol approved 6/23/98. |

### (3) Process Descriptions

|                                                                                       |                                                                                                                                                                                        |
|---------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| a. Description of process.                                                            | AA-008 Compound Mixing Area<br>AD-001 Blending Silo                                                                                                                                    |
| b. Description of pollution control system                                            | The particulate emissions on all sources are controlled by either a cartridge filter or bag equipped baghouse.                                                                         |
| b. Process design rates.                                                              | See Attachment "A"                                                                                                                                                                     |
| c. Proposed operating rate during the testing and verification of the operating rate. | Testing will be conducted with the production capacity at or near normal operating capacity. Operating condition during the tests will be recorded and verified by a control room DAS. |
| d. Description of any stack gas or opacity monitoring systems.                        | NA                                                                                                                                                                                     |
| e. Description of all air pollution control monitors. when applicable                 | NA                                                                                                                                                                                     |
| f. Pollution control operating parameters that will be recorded during the tests.     | The baghouse differential pressure will be recorded at the beginning and at the end of each test run.                                                                                  |
| g. Responsible party for obtaining the operating parameters.                          | CONDEA Vista Chemical control room personnel.                                                                                                                                          |

### (4) Safety Considerations

|                                                        |                                                                                                                                                                               |
|--------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| a. Identification of any risks.                        | Sample ports are accessible by ladder and the test area is enclosed by safety rails. Area on ground under sample ports should be made aware that people are working overhead. |
| b. List of all necessary or required safety equipment. | Hard hat, safety glasses, steel toed shoes. NOMEX or equivalent required while monitoring AD-001.                                                                             |

### (5) Sampling and Analytical Procedures

|                                                               |                                                                       |
|---------------------------------------------------------------|-----------------------------------------------------------------------|
| a. Description of sampling methods to be used.                | CFR 40 part 60 Appendix "A"<br>Methods 1-5.                           |
| b. Description of analytical methods to be used.              | Gravimetric analysis of the filter and probe wash accurate to 0.1 mg. |
| c. Number and duration of tests to be conducted.              | Three one hour test runs.<br>See also attachment "A".                 |
| d. Description of minimum sampling volumes for each test run. | Thirty dry standard cubic feet.<br>See also attachment "A".           |

|                                                                                                                                |                                                                                                                                                                                                                                         |
|--------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| e. Location where samples will be recovered.                                                                                   | Probe wash will be conducted at the location of the test ports. Filters will be transferred to petri dishes in the lab.                                                                                                                 |
| f. Explanation of how blank and recovery check results and analytical non-detects will be used in final emission calculations. | The total weight of the acetone blank samples will be deducted from the final weight of the probe wash weights based on the volume of acetone used to conduct the probe wash.                                                           |
| g. Maximum amount of time a sample will be held after collection prior to analysis.                                            | Five days.                                                                                                                                                                                                                              |
| h. Method of storing and transporting samples.                                                                                 | Acetone wash will be stored in polypropylene storage containers. The liquid level will be marked to verify no liquid was lost during transporting. The filters will be left in the filter assembly until transported to the laboratory. |

### (6) Sampling Locations and Documentation

|                                                                                |                                                                                                                                                                                                                                                    |
|--------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| a. Location of sampling sites.                                                 | See attachment "A".                                                                                                                                                                                                                                |
| b. A description of all emission points.                                       | The particulate emissions exits the process and passes through an baghouse to remove the particulate matter and exits the baghouse to the I.D. fan which transfers the cleaned air through the stack into the atmosphere. See also attachment "A". |
| c. Procedure for verifying absence of cyclonic or non-parallel stack gas flow. | CFR 40 part 60 appendix "A", method 1, section 2.4.                                                                                                                                                                                                |

### (7) Internal Quality Assurance/Quality Control (QA/QC) Measures. For each proposed test method when applicable.

|                                                                                                                                                                      |                                                                                                                                                                                                                                                                                          |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| a. Citation of the QA/QC procedures specified in the EPA Reference Methods and the EPA Quality Assurance Handbook for Air Pollution Measurement Systems, Volume III. | Entec Services, Inc. proposes to follow the QA/QC procedures for the project as outlined in the EPA Quality Assurance Handbook for Air Pollution Measurement Systems, Volume III (EPA/600/R-94/038c) and the Code of Federal Regulations 40 part 60, appendix A, methods 1,2,3,4, and 5. |
| b. Chain-of-custody procedures and copies of chain-of-custody forms.                                                                                                 | See attachment "B".                                                                                                                                                                                                                                                                      |
| c. Procedure for conditioning particulate matter filters (before and after source testing).                                                                          | Entec Services, Inc. proposes to follow the procedures outlined in the CFR 40 Part 60 Appendix "A" Method 5 and the QA/QC procedures outlined in the EPA Quality Assurance Handbook for Air Pollution Measurement Systems, Volume III (EPA/600/R-94/038c)                                |

|                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|-----------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>d. Procedure for conducting leak checks on vacuum lines, pitot tubes, flexible bags, fyrite, etc.</b></p> | <p><b>Vacuum line and metering system leak check</b> - CFR 40 part 60 appendix "A", method 5, section 4.1.4.</p> <p><b>Pitot tubes and lines</b><br/>CFR 40 part 60 appendix "A", method 2, section 3.1.</p> <p><b>Flexible bags</b><br/>CFR 40 part 60 appendix "A", method 5, section 2.2.6.</p> <p><b>Fyrite</b><br/>CFR 40 part 60. appendix "A", method 3, section 6.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <p><b>e. Equipment calibration frequencies, ranges, and acceptable limits.</b></p>                              | <p><b>Probe nozzle</b><br/>calibrated before and after each test run.<br/><i>acceptable limits</i> – difference between highest and lowest measurement shall not exceed 0.004 in.</p> <p><b>Pitot tube</b><br/><i>initial calibration</i> – once every six months.<br/><i>post test calibration</i> - once after field test is performed.<br/><i>acceptable limits</i> - average deviation (A and B side) must be &lt;0.01.</p> <p><b>Temperature gauges</b><br/>(probe heater , stack gas, meter in, meter out, impinger out, filter box)<br/>once after each field use.<br/><i>acceptable limits</i> - must be within 1.5% of the reference standard.</p> <p><b>Metering system</b><br/><i>initial calibration</i> - once every six months.<br/><i>acceptable limits</i> - Y factor cannot differ by more than 2% from the average.<br/><i>post test calibration</i> - after each field use at one intermediate orifice setting based on the previous field test maximum orifice reading.<br/><i>acceptable limits</i> - less than 5 % form the initial Y value calibration.</p> |

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| <b>f. Minimum detection limits of analytical instrumentation.</b>                                                                           | Entec Services, Inc. proposes to meet the minimum detection limits outlined in the CFR 40 Part 60 Appendix "A" Method 5 and the QA/QC procedures outlined in the EPA Quality Assurance Handbook for Air Pollution Measurement Systems, Volume III (EPA/600/R-94/038c) |
| <b>g. Names, addresses and responsible persons sub-contracting</b>                                                                          | N/A                                                                                                                                                                                                                                                                   |
| <b>h. QA/QC measures associated with the collection and analysis of process and the frequency at which these samples will be collected.</b> | N/A                                                                                                                                                                                                                                                                   |
| <b>i. Methods for interference and matrix effects checks, and number of replicate analyses.</b>                                             | N/A                                                                                                                                                                                                                                                                   |
| <b>j. Methods and concentrations for internal standards (standards additions prior to extraction).</b>                                      | N/A                                                                                                                                                                                                                                                                   |
| <b>k. Methods and concentrations for surrogate standards (standards additions prior to extraction).</b>                                     | N/A                                                                                                                                                                                                                                                                   |
| <b>l. Methods for recovery checks, field blanks, lab blanks, reagent blanks, proof rinse blanks, and analytical blanks.</b>                 | CFR 40 part 60 Appendix "A" method 5 section 4.3.                                                                                                                                                                                                                     |
| <b>m. Proposed range of recoveries for data acceptability</b>                                                                               | Results are reported to the nearest 0.1 mg.                                                                                                                                                                                                                           |
| <b>(8) Final Test Report Content</b>                                                                                                        |                                                                                                                                                                                                                                                                       |
| <b>a. Final report outline.</b>                                                                                                             | Cover letter<br>Table of Contents<br>Executive Summary<br>Field and Laboratory Data<br>Production Data<br>Test Procedures<br>Equipment Calibration<br>Test Calculations and Nomenclature.                                                                             |
| <b>b. Example calculations</b>                                                                                                              | See attachment "C"                                                                                                                                                                                                                                                    |
| <b>c. Proposed report submission date</b>                                                                                                   | November 22, 1999                                                                                                                                                                                                                                                     |

## **ATTACHMENT A**

### **Location of Sampling Sites and Operating Conditions During the Testing**

The following sources will be tested in accordance with the CFR 40 Part 60 Appendix A Method 5:

- AD-001 (Silo 692)
- AC-008 Line I resin blower
- AC-008 Line II resin blower
- AC-008 Filler blower
- AC-008 masterbatch resin blower
- AC-008 Line 1 rework blower
- AC-008 vacuum system
- AC-008 silo 477 bin vent
- AC-008 silo 480 bin vent
- AC-008 ATH blower
- AC-008 Line 2 rework blower

Due to the short distance of the exhaust exiting to the atmosphere on each of the sources, the length of the exhaust will be extended in order for the exhaust stack to meet the upstream and downstream disturbances as outlined in the CFR 40 Part 60 Appendix A Method 1. The exhaust will be extended using flexible pipe extending from the exhaust to a rigid pipe at the particulate measuring plane. The rigid pipe will have sufficient length to provide a minimum eight duct diameters upstream and two duct diameters downstream from the nearest disturbance.

Due to cycling operation of the AC-008 line I resin blower, AC-008 Line II resin blower, AC-008 filler blower, AC-008 masterbatch resin blower, AC-008 Line 1 rework blower, AC-008 vacuum system, AC-008 ATH blower, AC-008 Line 2 rework blower the testing will start and stop as the process blower starts and stops until one hour of sampling is

completed on each of the sources. The approximate cycling operates for 15 minutes and is idle for 15 minutes.

The AC-008 silo 477 bin vent and the AC-008 silo 480 bin vent operate only when trucks are loading therefore sampling will be conducted only as the trucks are loading. The approximate time to load a truck is approximately three hours. To expedite the testing, the loading of the trucks will cease at the end of each one hour test run and commence upon the start of the next test run until the completion of three one hour test runs.

The operating conditions of the AD-001 (Silo 692) baghouse will allow for the baghouse to operate continuously for the duration of three one hour test runs.

# ATTACHMENT B

## CHAIN OF CUSTODY

PLANT \_\_\_\_\_

DATE SAMPLED \_\_\_\_\_ TEST NUMBER \_\_\_\_\_

RUN NUMBER \_\_\_\_\_

| SAMPLE RECOVERY<br>CONTAINER CODE | DESCRIPTION |
|-----------------------------------|-------------|
|                                   |             |
|                                   |             |
|                                   |             |
|                                   |             |
|                                   |             |
|                                   |             |
|                                   |             |

Person engaged in sample recovery \_\_\_\_\_  
 Signature \_\_\_\_\_  
 Title \_\_\_\_\_  
 Location of Recovery \_\_\_\_\_  
 Date \_\_\_\_\_

Sample(s) recipient (if not recovery person) \_\_\_\_\_  
 Signature \_\_\_\_\_  
 Title \_\_\_\_\_  
 Date \_\_\_\_\_ Time \_\_\_\_\_  
 Sample storage \_\_\_\_\_

Laboratory person receiving sample \_\_\_\_\_  
 Signature \_\_\_\_\_  
 Title \_\_\_\_\_  
 Date \_\_\_\_\_ Time \_\_\_\_\_  
 Sample storage \_\_\_\_\_

| Container Code | Analytical Method | Date and Time of<br>Analysis | Signature of<br>Analyst |
|----------------|-------------------|------------------------------|-------------------------|
|                |                   |                              |                         |
|                |                   |                              |                         |
|                |                   |                              |                         |
|                |                   |                              |                         |
|                |                   |                              |                         |
|                |                   |                              |                         |

# ATTACHMENT C

## TEST CALCULATIONS

### I. Determination of Moisture in Stack Gases

- a. Volume of Water Vapor Collected (Cubic Feet):  

$$V_{wstd} = 0.04707 * (V_{lc})$$
- b. Dry Gas Volume Through Meter (Cubic Feet):  

$$V_{mstd} = 17.64 * V_m * Y * \{ (P_{bar} + (H/13.6)) / T_m \}$$
- c. Moisture Content (Percent):  

$$B_{ws} = V_{wstd} / \{ V_{wstd} + V_{mstd} \} * 100$$
- d. Wet Molecular Weight : (Ms)  

$$M_s = \{ M_d * (1 - B_{ws}) \} + \{ 18.0 * B_{ws} \}$$

### II. Actual Stack Gas Volume Sampled (Cubic Feet):

$$V_{ma} = \{ V_{mstd} * T_s * P_{std} \} / \{ (1 - B_{ws}) * T_{std} * P_s \}$$

### III. Determination of Stack Gas Velocity & Volumetric Flow Rate

- a. Stack Gas Velocity (Feet per Second):  

$$V_s = K_p * C_p * (S_q R P) * \{ S_q R (T_s / (P_s * M_s)) \}$$
- b. Stack Volumetric Flow Rate (Cubic Feet per Minute):
  1. Dry Standard Conditions (Qs)  

$$Q_s = 60 * (1 - B_{ws}) * V_s * A_s * (T_{std}/T_s) * (P_s/P_{std})$$
  2. Actual Conditions (Qa)  

$$Q_a = V_s * A_s * 60$$

### IV. Determination of Particulate Concentration (Grainloading)

- a. Dry Standard Conditions: (cs)  

$$cs = 0.01543 * (M_n / V_{mstd})$$
- b. Actual Conditions: (csl)  

$$csl = 0.01543 * (M_n / V_{ma})$$

### V. Emission Rate (Pounds per Hour)

$$E = 60 * Q_s * cs / 7000$$

### V. Emission Rate (Pounds per mmBtu) Method 19 Oxygen based F-Factor Dry Basis

$$E_{mmBtu} = F_d * 20.9 * cs / (7000 * (20.9 - \text{measured } O_2))$$

### VI. Determination of Acceptability of Sampling Results: (I)

$$I = (0.0945 * T_s * V_{mstd}) / \{ O * V_s * P_s * A_n * (1 - B_{ws}) \}$$

# ATTACHMENT C

## NOMENCLATURE

|         |                                                           |
|---------|-----------------------------------------------------------|
| As      | Cross-sectional area of stack, square feet                |
| An      | Cross-sectional area of nozzle, square feet               |
| ACF     | Actual cubic feet of gas at stack conditions              |
| ACFM    | Actual cubic feet of gas per minute at stack conditions   |
| Bws     | Proportion by volume of water vapor in gas stream         |
| cs      | Particulate concentration in stack gas, gr/dscf           |
| csl     | Particulate concentration in stack gas, gr/ACF            |
| Ca      | Acetone blank residue concentration, mg/g                 |
| Cp      | Pitot tube coefficient                                    |
| delta H | Pressure drop across orifice meter, inches water          |
| dp      | Nozzle diameter, inches                                   |
| delta P | Velocity head of stack gas, inches water                  |
| dscf    | Cubic feet of dry gas corrected to standard conditions    |
| E       | Particulate emission rate, pounds/hour                    |
| E/Btu   | Particulate Emission Rate, pounds/mmBtu                   |
| Fd      | F-factor, dscf/mmBtu of fuel heat input                   |
| Kp      | Constant (85.49)                                          |
| Ma      | Mass of residue of acetone after evaporation, mg          |
| Maw     | Mass of residue of acetone blank, mg                      |
| Mf      | Particulate matter collected on filter, mg                |
| Mn      | Total particulate matter collected, mg                    |
| I       | Percent of isokinetic sampling                            |
| Pa      | Density of acetone, mg/ml                                 |
| Pbar    | Barometric pressure, inches mercury                       |
| Pm      | Barometric pressure of dry gas meter, in. mercury         |
| Ps      | Absolute stack gas pressure, inches mercury               |
| Pstd    | Barometric pressure, standard conditions, 29.92 "Hg       |
| Qa      | Volumetric flow rate, actual conditions, ACF/min          |
| Qs      | Volumetric flow rate, dry standard conditions, dscf/min   |
| Tm      | Absolute average dry gas meter temperature, degree R      |
| Ts      | Absolute average stack gas temperature, degree R          |
| Tstd    | Absolute temperature at standard conditions, 528 R        |
| O       | Total sampling time, minutes                              |
| Va      | Volume of acetone blank, ml                               |
| Vaw     | Volume of acetone used in wash, ml                        |
| Vf      | Final volume of impinger contents, ml                     |
| Vi      | Initial volume of impinger contents, ml                   |
| Vlc     | Total volume collected in impingers and silica gel, ml    |
| Vm      | Volume of gas sampled through gas meter, cubic feet       |
| Vma     | Stack gas volume sampled, ACF                             |
| Vmstd   | Volume of gas sampled through gas meter, cubic feet       |
| Vs      | Average stack gas velocity, feet/sec                      |
| Vwstd   | Volume of water vapor in gas sampled, standard cubic feet |
| Wa      | Weight of residue in acetone wash, mg                     |
| Wf      | Final weight of filter or probe wash beaker, g            |
| Wi      | Initial weight of filter or probe wash beaker, g          |
| Y       | Dry gas meter calibration factor                          |