



**TRC Environmental**

**TEST PLANNING**  
**HOWARD F. SCHIFF**  
**TRC ENVIRONMENTAL CORPORATION**



# TABLE OF CONTENTS

- I. Requirements for Emission Tests
- II. Selection of Air Emission Testing Body and Qualifications
- III. Test Method Selection
- IV. Site Survey and Site Preparation
- V. Sampling Equipment Calibrations
- VI. Site Specific Test Plans
- VII. Safety



# I. REQUIREMENTS FOR EMISSION TESTS

- A. State PSD and Title V Permit Delineates Pollutants and Methods
  
- B. EPA Regulations delineate pollutants and methods
  - 40 CFR 60 New Source Performance and Standards (NSPS)
  - 40 CFR 61 National Emission Standards for Hazardous Air Pollutants (NESHAPS)
  - 40 CFR 63 NESHAPS for Source Categories
  - 40 CFR 75 Acid Rain
  
- C. Compliance Actions – EPA or State Agency
  - As a result of Inspection
  - A result of EPA rule, effectiveness demonstration oversight on State
  - A notice of violation or deficiency
  - Delineate testing requirements



# I. REQUIREMENTS FOR EMISSION TESTS (cont'd)

## D. Ongoing Periodic Demonstration of Compliance

- Required in permit and or regulation
  - Hazwaste combustors every five (5) years
  - CEMS relative accuracy tests, CGA Annually



## II. SELECTION OF AIR EMISSION TESTING BODY & QUALIFICATIONS

- A. Send RFP and AETBS Delineating Pollutants With Permit
  - Request Statement of Qualifications
  
- B. For Part 75 CEMS Performance Tests as of January 1, 2009 [40CFR75 Appendix Section 6.1.2]
  - The AETB has to be accredited to ASTM D7036
  - (STACS)
  
- C. The AETB has to have a Qualified Stack Test Individual Onsite to oversee all Part 75 CEMS Performance Tests
  
- D. States are now requiring AETB accreditation to ISO 17025 by own accrediting authority for both sampling and analysis; Louisiana - LADEQ, Texas-TCEQ, and California-CARB



## II. SELECTION OF AIR EMISSION TESTING BODY & QUALIFICATIONS

E. Look for experience in conducting tests that are required by Permit, EPA or State request



## III. TEST METHOD SELECTION

### I. DEFINE REQUIREMENTS

- Determine if a promulgated method exists for analyses of interest
- Review the limitations of method against the permit requirements and physical and chemical characteristics of the source gas to be tested. For instance, concentration to be quantified.

#### Example 1

- If a source has high SO<sub>2</sub> and moderate SO<sub>3</sub> concentration, have to determine particulate matter.
- Method 5 would not be appropriate as these compounds absorb to the filter and cause a high bias.
- Methods 5B and 5F would be more appropriate as the absorbed SO<sub>2</sub>/SO<sub>3</sub> would be eliminated from the final weight by the Method.



### III. TEST METHOD SELECTION (cont'd)

#### Example 2

- Permit limits for particulates are extremely low and the source concentration is expected to be 0.1 of the standard. Method 5I would be more appropriate than Method 5
- Method 5I requires a minimum catch of 3mg. Base sample volume and time on collecting 3mg for 0.1 of the standard in stack concentration. This will be useful for logistics and cost.

Limit is 0.009 lb/hour  
Flow rate = 12,284 dscfm  
453600 mg/lb



### III. TEST METHOD SELECTION (cont'd)

- In stack limit =  $0.009 \text{ lb/hour} \times 453600 \text{ mg/lb} \div 12,284 \text{ dscfm} \times 1/60 \text{ min/hr} = 5.539 \text{ E-3 mg/dscf}$
- dscf to collect at limit
  - $\text{dscf} = 3\text{mg} \div 5.539 \text{ E-3 mg/dscf} = 541.62$
  - $\text{run time} = 541.62 \div 0.75 \text{ dscfm} = 722 \text{ min.} = 12.1 \text{ hours}$
- dscf to collect at 0.1 limit
  - $\text{dscf} = 3\text{mg} \div 5.539 \text{ E-4 mg/dscf} = 5416.2$
  - $\text{run time} = 5416.2 \text{ dscf} \div 0.75 \text{ dscfm} = 7,221.6 \text{ min} = 120.4 \text{ hours}$



### III. TEST METHOD SELECTION (cont'd)

#### II. METHODS

A. Delineated in Permit e.g. VOC by EPA Method 18 (GE), EPA Method 25A or Method 25.

B. Delineated in EPA & State Agency Regulations

C. Methods are found in:

40 CFR Part 51 Appendix M

60 Appendix A

60 Appendix B-CEMS Performance Tests

61 Appendix B

63 Appendix A

75 Appendices A – H

OSW SW846 Hazardous Waste Sampling and Analytical Methods



### III. TEST METHOD SELECTION (cont'd)

D. ASTM Methods are incorporated by References 60.17, 61.18, 63.14, 75.6

E. State and Local Air Districts have Methods that are not in EPA Method Groups:

- CARB Methods
- SCAQMD Methods
- Bay Area AQMD Methods
- Texas
- Oregon
- Pennsylvania
- National Council for Air & Stream Improvement (NCASI)
  - E.G. Method 8A Controlled Condensation System for SO<sub>3</sub>/H<sub>2</sub>SO<sub>4</sub> Mist.
- OSHA & NIOSH Methods can act as alternates for M-18.



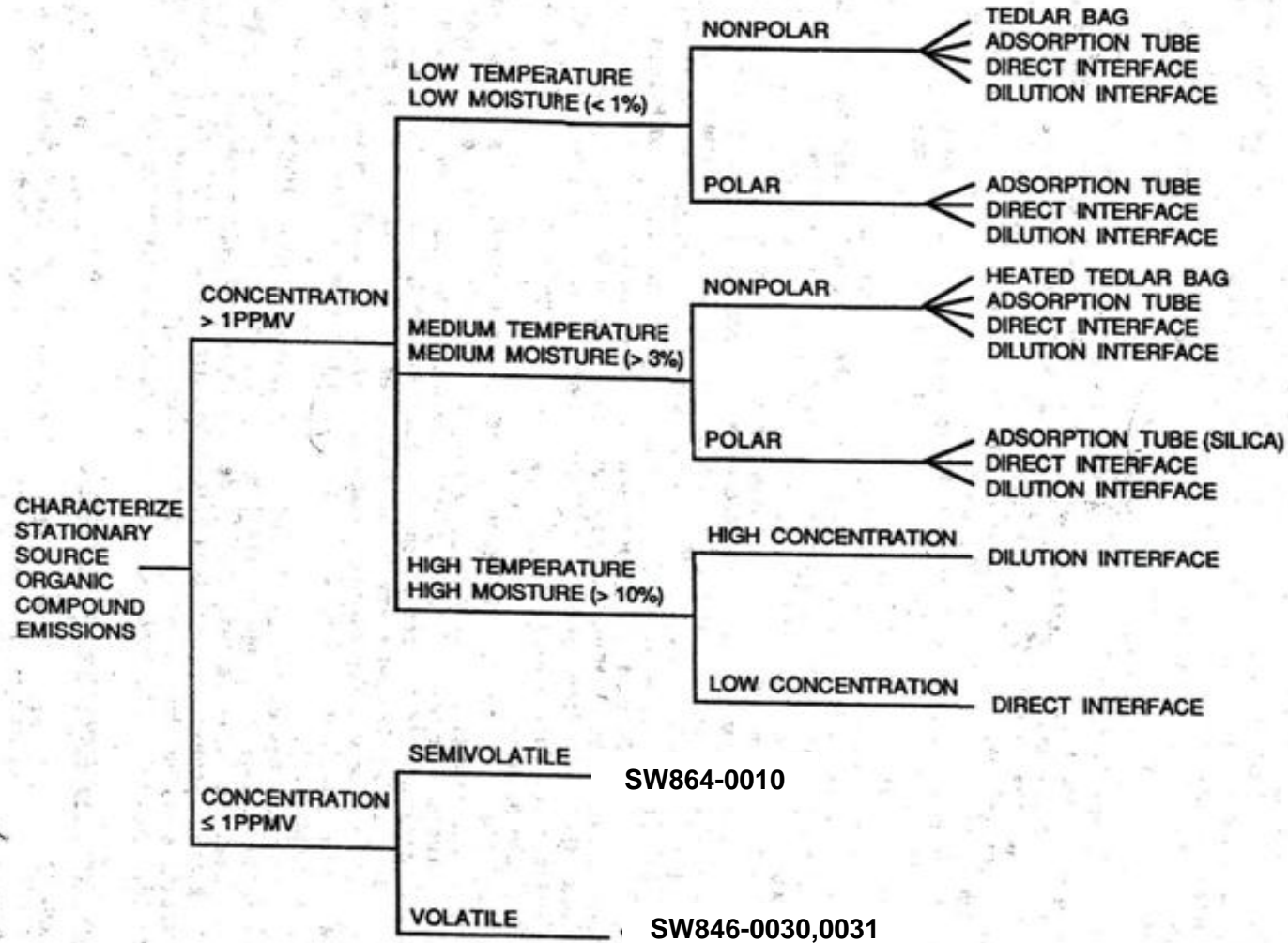
### III. TEST METHOD SELECTION (cont'd)

#### F. Emission Measurement Center ([www.EPA.gov/ttn/methods](http://www.EPA.gov/ttn/methods))

- Alternate Methods
  - Conditional/Other Test Methods
- When a method is not delineated, select as appropriate from above and propose in specific test plan.
- When a promulgated method has to be modified or changed, propose the method deviation in the site specific test plan and delineate the reason for the deviation.
- A new method can be proposed and validated accordingly to 40 CFR 63, Method 301.



# III. TEST METHOD SELECTION (cont'd)



## IV. SITE SURVEY AND SITE PREPARATION

### AETB Conducts a Site Survey for Information for Site Specific Test Plan

- Obtain source & control device operations, conditions, and how to obtain data
- Location of existing sampling ports, platforms, and scaffolding
- Delineate sampling port locations
- Electric Power:
  - 220 volt 100 amps for CEMS Trailer
  - 220 volt 100 amps for Field Trailer
  - Separate 20 amp, 120 volt circuit for each sampling train and heated sample line at each sampling location
- Determine where to site both trailers
- Safe access to sampling locations



## IV. SITE SURVEY AND SITE PREPARATION (cont'd)

- Platform on stack with installed ladders
- Temporary scaffolding and ladders
- Inspect stack platform and ladders for corrosion, broken sections and loose sections.
- Broken ladder rungs, guard rails, and toe boards
- PPE requirements



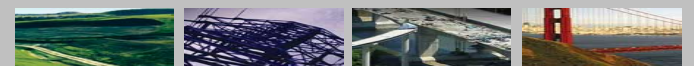
## V. SAMPLING EQUIPMENT CALIBRATIONS

- Pitot Tubes, Conformation and Configuration Pre/Post Test
- Dry Gas Meter against Wet Test Meter, Dry Standard Gas Meter Or
- Critical Orifices Pre/Post Test
- Temperature Display Modules Pre/Post Test
- Thermocouples in Sampling Configuration Pre/Post Test
- Calipers Annually
- Analytical/Top Loader Balances Annually
- Analytical Weights; 0-100 gm – Annually
- Top Loader Check Weight; 50, 500, 1000, 2000 gms – Annually



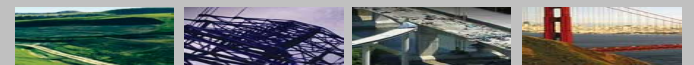
## V. SAMPLING EQUIPMENT CALIBRATIONS (cont'd)

- Critical Orifice Sets Annually
- West Test Meter, Standard Dry Gas Meter Annually
- Continuous Emission Monitor Pre/Post Test
- Bubble Meter, Buck Wet, Bios Dry Annually
- Thermocouple Calibrator Annually



## VI. SITE SPECIFIC TEST PLANS (SSTP)

- The SSTP is the contract among the Facility, AETB and the Regulatory Agency
- EPA Emission Measurement Center Guideline Document GD-042 Preparation and Review of Site Specific Test Plans (SSTP)
- Various states have specifications for SSTP's
- This plan describes, in detail, the purpose of the testing program, parameters of interest and associated sample collection techniques, and the analytical methods to be used as part of the test program.
- The plan specifically identifies which testing and analysis methods that are utilized.
- Any proposed deviations from the standard sampling procedures are discussed in this document.
- QA/QC Procedures and Criteria



## VI. SITE SPECIFIC TEST PLANS (SSTP) (cont'd)

The Table of Contents MUST include, at a minimum, the items shown below (from GD-042:)

### Title Page

- 1.0 Introduction
  - 1.1 Summary and Objectives of Test Program
  - 1.2 Test Program Organization
  
- 2.0 Source Description
  - 2.1 Process Description – Operating Conditions
  - 2.2 Control Equipment Description
  
- 3.0 Test Program
  - 3.1 Objectives
  - 3.2 Test Matrix



## VI. SITE SPECIFIC TEST PLANS (SSTP) (cont'd)

- 4.0 Sampling Locations
  - 4.1 Flue Gas Sampling Locations
  - 4.2 Process Sampling Locations
  
- 5.0 Sampling and Analytical Procedures
  - 5.1 Test Methods No. of Runs, Duration of Run
  - 5.2 Process Data
  - 5.3 Deviations
  
- 6.0 QA/QC Activities
  - 6.1 QC Procedure
  - 6.2 QA Audits
  - 6.3 QA/QC Checks for Data Reduction and Validation



## VI. SITE SPECIFIC TEST PLANS (SSTP) (cont'd)

### 7.0 Reporting and Data Reduction Requirements

7.1 Report Format

7.2 Data Reduction and Summary

### 8.0 Plant Entry and Safety

8.1 Safety Responsibilities

8.2 Safety Program

8.3 Safety Requirements

### 9.0 Personnel Responsibilities and Test Schedule

9.1 Test Site Organization

9.2 Test Preparations

9.3 Test Personnel Responsibilities and Detailed Schedule



## VI. SITE SPECIFIC TEST PLANS (SSTP) (cont'd)

- List of Tables
- List of Figures

### Appendices

A Datasheets

B Calculations

C Calibration Forms

D Facility Permit

E Test Methods Including Non-Standard Methods

- An expanded and detailed discussion of test plan contents will be found in USEPA EMC Guidance Document GD-042.



2-3

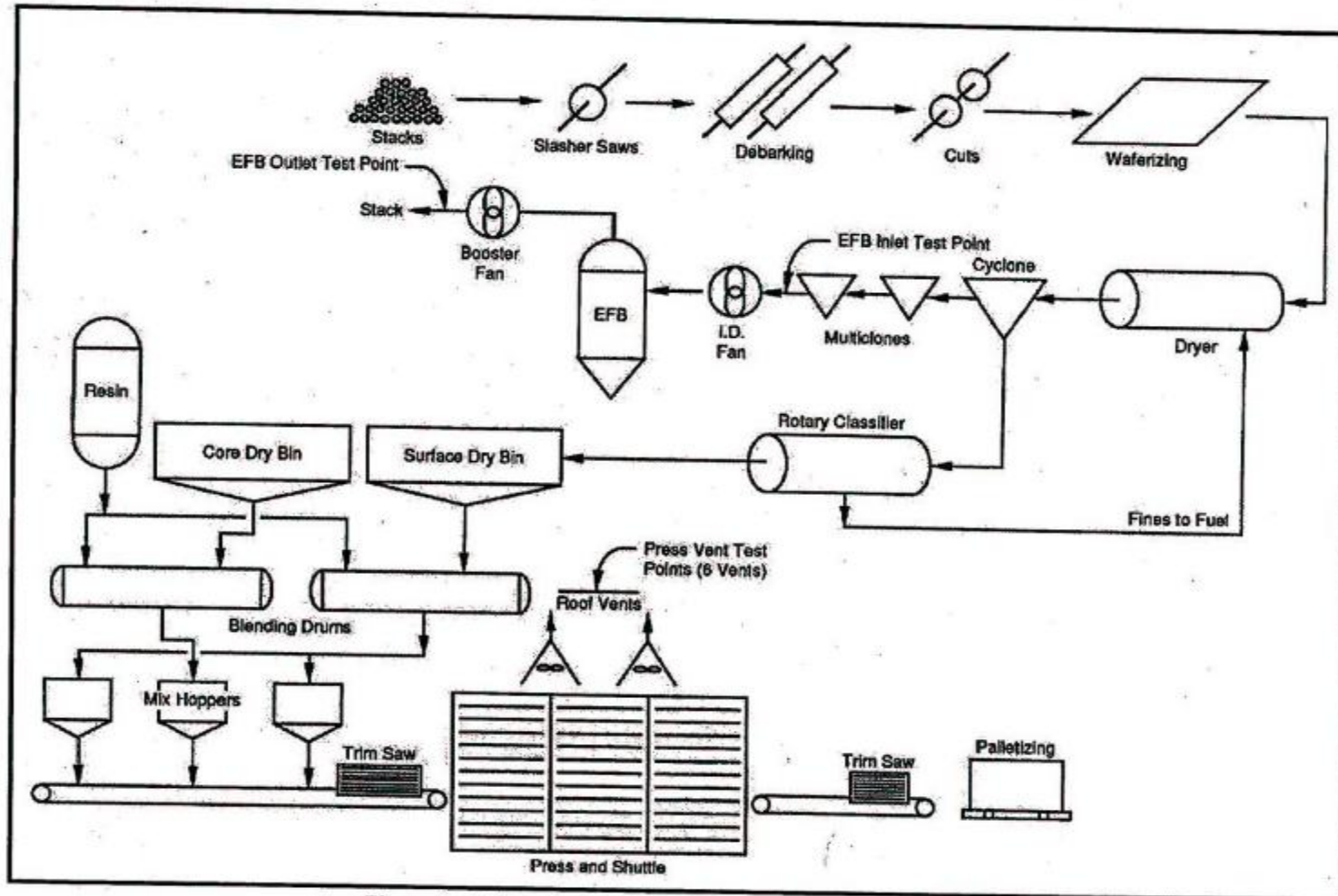


Figure 2-1 Oriented strand board (OSB) process flow diagram.



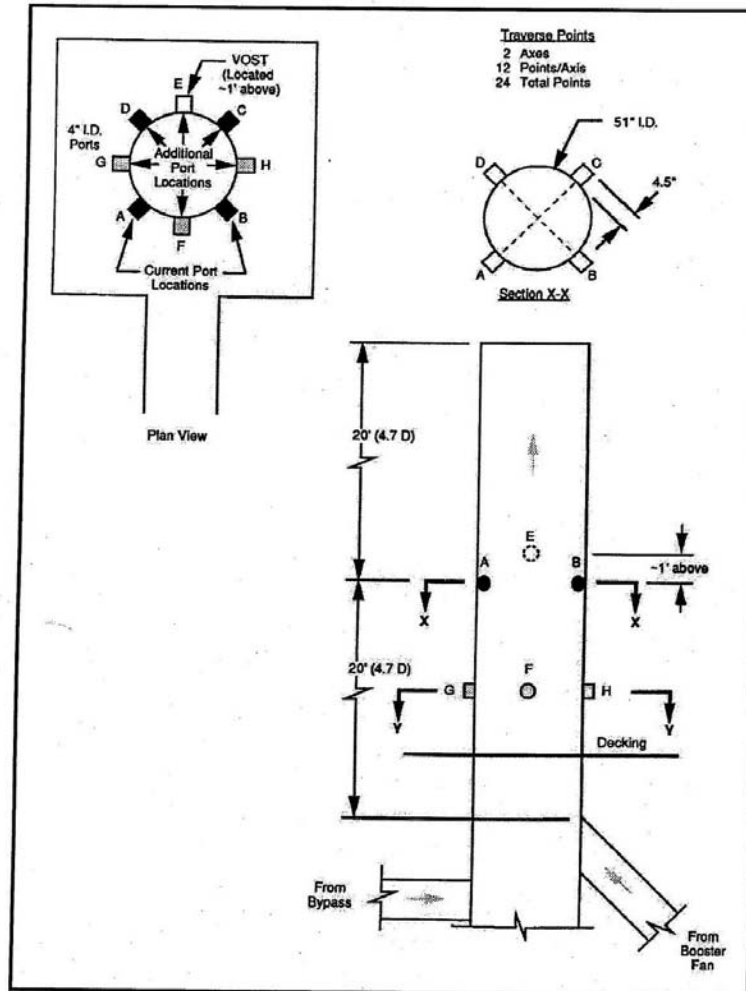


Figure 4-2 Schematic of Unit 1 EFB outlet stack sampling location.



TABLE 3-1. [PLANT, LOCATION] TEST MATRIX

Sampling Location	No. of Runs	Sample Type/Pollutant <sup>a</sup>	Sampling Method <sup>b</sup>	Sampling Org	Sample Run Time (min)	Analytical Method	Analytical Laboratory
Outlet Stack	3	PM/CPM	M202 (M5 Filter and Backup Filter) <sup>d</sup>	Ctr-A	60	Gravimetric (PM-M5, CPM-M202, Backup Filter-ODEQ M7)	PM/CPM-Ctr-A Backup Filter-Trade Org
Outlet Stack	3	O <sub>2</sub> /CO <sub>2</sub>	M3 (bag)	Ctr-A	60	Orsat (M3)	Ctr-A
Outlet Stack	3	CO	M10 (CEM)	Ctr-A	60	NDIR (M10)	Ctr-A
Outlet Stack	3	NO <sub>x</sub>	M7E (CEM)	Ctr-A	60	Chemiluminescence (M7E)	Ctr-A
Outlet Stack	6 <sup>e</sup>	THC	M25A (CEM)	Ctr-A	60	FID (M25A)	Ctr-A
Outlet Stack	6 <sup>e</sup>	TGNMO (dual train)	M25	Trade Org	60	Catalysis, GC/FID, NDIR (M25)	Trade Org
Outlet Stack	3	Formaldehyde/Aldehydes/Ketones	SW-846 M0011	Ctr-A	60	HPLC (M0011)	Lab-A
Outlet Stack	3	VOC <sup>c</sup>	SW-846 M0010 (MM5)	Ctr-A	60	HRGC/LRMS (M8270), HPLC	Lab-B/ Lab-A
Outlet Stack	3	VOC <sup>e</sup>	SW-846 M0030 (VOST)	Ctr-A	60	HRGC/LRMS (M5040 and M8240)	Lab-B
Outlet Stack	3 <sup>h</sup>	TOC	Evacuated Cylinder	Ctr-B	60	Catalytic FID	Ctr-B
Inlet	3	PM/CPM	M202 (M5 Filter and Backup Filter) <sup>d</sup>	Ctr-A	60	Gravimetric (PM-M5, CPM-M202, Backup Filter-ODEQ M7)	PM/CPM-Ctr-A Backup Filter-Trade Org
Inlet	6 <sup>e</sup>	O <sub>2</sub> /CO <sub>2</sub>	M3	Ctr-A	60	Orsat (M3)	Ctr-A
Inlet	6 <sup>e</sup>	THC	M25A (CEM)	Ctr-A	60	FID (M25A)	Ctr-A
Inlet	3	TGNMO (dual train)	M25	Trade Org	60	Catalysis, GC/FID (M25)	Trade Org
Inlet	3	Formaldehyde/Aldehydes/Ketones	SW-846 M0011	Ctr-A	60	HPLC (M0011)	Lab-A

3-3



## VI. SITE SPECIFIC TEST PLANS (SSTP) (cont'd)

### A. Preparation of Quality Assurance Project Plans

- Due to the nature of the Test Program, EPA and State Agencies may require the preparation of Quality Assurance Project Plan (QAPP)
- Explicit QA/QC Data Quality objectives to be delineated.
- QAPP's are always prepared and submitted to a regulatory agency for approval prior to conducting any testing.
- EPA QA/R-5 EPA Requirements for Quality Assurance Plans, EPA/240/B-01/003, March 2001
- EPA QA/G-5 Guidance for Quality Assurance Project Plans, EPA/240/R-02/009, December 2002.



# ELEMENTS OF A QAPP

## LIST OF QA PROJECT PLAN ELEMENTS

<b><u>GROUP A</u></b> <b>Project Management</b>	<b><u>GROUP B</u></b> <b>Data Generation &amp; Acquisition</b>	<b><u>GROUP C</u></b> <b>Assessment &amp; Oversight</b>
A1 Title & Approval Sheet	B1 Sampling Process Design (Experimental Design)	C1 Assessments and Response Actions
A2 Table of Contents	B2 Sampling Methods	C2 Reports to Management
A3 Distribution List	B3 Sample Handling and Custody	
A4 Project/Task Organization	B4 Analytical Methods	<b><u>GROUP D</u></b> <b>Validation &amp; Usability</b>
A5 Problem Definition & Background	B5 Quality Control	D1 Data Review, Verification, & Validation



# ELEMENTS OF A QAPP (cont'd)

## LIST OF QA PROJECT PLAN ELEMENTS

A6 Project/Task Description	B6 Instrument/Equipment Testing, Inspection and Maintenance	D2 Verification and Validation Methods
A7 Quality Objectives and Criteria	B7 Instrument/Equipment Calibration and Frequency	D3 Reconciliation with User Requirements
A8 Special Training/Certification	B8 Inspection/Acceptance of Supplies and Consumable	
A9 Documentation and Records	B9 Non-direct Measurements	
	B10 Data Management	



## VII. SAFETY

- Daily inspection of ladders, scaffolding and sign off by Facility Safety Officer
- Facility Safety Program - Abide by the Facility Safety Requirements
- Basic PPE (Personal Protective Equipment)
  - Hardhats
  - Safety Glasses, Goggles
  - Steel Toe Boots
  - Leather Gloves
  - High Temperature Gloves
  - Long Sleeve Shirts and Jackets
  - Air Purified Gas Masks
  - Harness and Climbing Device



## VII. SAFETY (cont'd)

- Source Evaluation Society Safety Manual Safety Check Lists
- Some Facilities Require 40 Hour OSHA Training
- Daily Tailgate Meetings
- Communications
- Safety Training Specific to Site



## VII. SAFETY (cont'd)

### TOOL BOX MEETING DAILY SAFETY CHECKLIST

- Weather** Wind Direction / Forecast / Ice - Rain / Clothing  
Temperature / Enough liquids
- Personal** Tired / Sick / On Medicine
- Test Location** Heights - Climbing Harness / - Tie Offs  
Platform Checked / Scaffold Checked  
Skylights - Roof checked and marked  
Prevent falling objects - Mark off area under you  
Ambient air quality
- Escape Route** Wind Direction / Obstacles-Hazards in the route  
More than 1 way out  
Staying where you are may be the best escape
- Testing Source** Dangerous (SCBA, Mask, Escape)  
Hot / Positive Pressure
- Equipment** Electrical - checked, GFIs  
Chemical - personal protective equipment  
Cylinders / Probe - Water Cooled
- Surroundings** Who is your mate / supervisor?  
Site traffic  
Upwind/downwind  
Where is your rally point?  
Does the site know where you are?
- Communications** Radio / land line / cell phone, etc.  
Between test location / test leader / site contact /  
control room
- Emergency** Telephone # for first aid  
Telephone # for fire department  
Location for eyewash / showers / fire extinguishers  
Location for hospital  
Alarm signals

**BE SAFE TODAY. WHEN IN DOUBT, ERR ON THE SAFE SIDE.**

