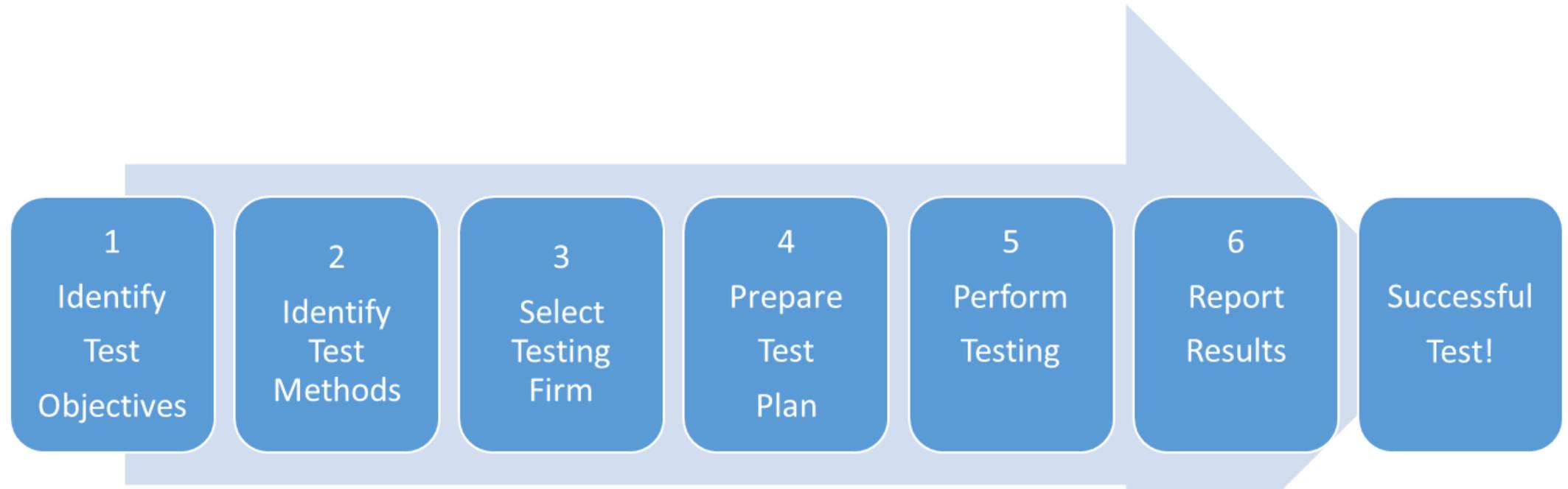


Implementing a Successful Air Quality Measurement Testing Program

Anita Doepke – National Market Director

AWMA- Southern Section Annual Conference
September 12, 2019

Six Key Factors: Source Testing Success



1. Identify Test Program Objectives



Emission Tests are Performed for Four Primary Reasons:

1. **Compliance Demonstration** (e.g. MACT, Permit, etc.)
2. **Continuous Emission Monitoring System** (CEMS) or Predictive Emission Monitoring System (PEMS) Relative Accuracy Test Audit (RATA) determination
3. **Engineering**
 - Air Pollution Control Equipment Design
 - Permitting/Emission Inventory
 - Fuel Trials
 - Process Optimization
4. **Vendor Guarantee Demonstration**
 - Air Pollution Control Equipment
 - Process Equipment



2. Select Test Methods To Fulfill Objectives



Emission Test Methods Are Available From Several Sources

- Environmental Protection Agency
- State and Local Regulatory Agencies (CA, TX, SCAQMD)
- ASTM (formerly American Society for Testing and Measurement)
- National Institute for Occupational Safety and Health
- Occupational Safety and Health Administration (NIOSH & OSHA)
- National Council for Air and Stream Improvement (NCASI)



2. Select Test Methods that Will Fulfill Objectives



Which method to use? Why does it matter?

- ***The required test methods are specified by the applicable emission standard or operating permit.***

Choosing a “better” method may not yield comparable results or comply with regulatory requirements.

- ***The method defines the result.***

Different methods can yield different results. In fact, many standards derive from results of specific test programs (NSPS, MACT, ICR)

A photograph of a "TITLE V OPERATING PERMIT" form. The form includes a header with the Connecticut State Seal and the title "TITLE V OPERATING PERMIT". Below the header is a table with the following information:

Title V Permit Number	088-0028-TF
Client Sequence/Town/Permit Number	11381-98-13
Original Permit Issue Date	April 13, 2009
Expiration Date	April 13, 2014

Below the table, the form lists:

Corporation: The University of Connecticut, Storrs Campus
Permit Location: 31 LeDoye Road, Storrs, CT 06269-3053
Name of Responsible Official and Title: Michael J. Hogan, President

At the bottom, there is a signature line for "J. Anne Gibson, Esq." dated "April 13, 2009" and the text "The University of Connecticut - Storrs Campus". The bottom right corner indicates "Page 1 of 63" and "Permit No. 088-0028-TF".

3. Select a Qualified Test Firm



ASTM D7036 (*“Standard Practice for Competence of Air Emission Testing Bodies”*) is **process-based** standard that enables an Air Emission Testing Body (AETB) to produce data of defined and documented quality.

- Approximately 300 source testing firms in the US
- Perhaps 100 self-declare conformance to ASTM D7036
- Approximately 20 have pursued third-party accreditation through the Stack Testing Accreditation Council (STAC)
- USEPA requires firms to have this certification to perform Part 75 RATA test programs



4. Document the Test Plan in Writing

ASTM D7036 Incorporates [EPA Guideline Document 42](#) for Test Plan Preparation

- Objectives and Summary of Test Program
- Source Information
- Sampling Locations
- Test Matrix
- Test Methods, Number of Runs, Run Duration
- Process Data
- QC Procedures & Audits
- Reporting Format, Units
- Plant Entry and Safety
- Personnel Responsibilities
- Tentative Test Schedule



Why is Test Plan Mandatory For Some Projects?



- Primary source of testing and QC procedures for a test project
- Test plan, along with QM, forms the basis for a field audit
- **Essential to ASTM D7036 conformance as test program oversight by a Qualified Individual**

Compliance Test Protocol
Indiana Department of Environmental Management
Office of Air Quality/Compliance Data Section
100 North Senate Avenue, Post Office Box 6015
Indianapolis, IN 46206-6015
Phone: 317/232-8338 Fax: 317/233-6865

Date Prepared: 05/09/19	Proposed Test Date: 06/25/19	Plant Address:	Plant Location:
1. SOURCE INFO: ID/Permit No.: 030-36577-00112	5. Select Applicable Program:	AGENCY USE ONLY:	Date Received:
Company:	Title V <input type="checkbox"/> FESOP <input type="checkbox"/>	Inspector:	Approval Date:
Mail Address:	SSOA <input type="checkbox"/> MSOP <input type="checkbox"/>	Reviewer:	Comments:
City, State, Zip:	Other <input type="checkbox"/>		
Contact:	Phone:		

ASTM D7036 defines content requirements, not form. A test plan/protocol can take any form as long as content requirements are satisfied.

Note that many local agencies require test plans in specific formats and that they must approve the test plans in advance of testing

5. Conduct the Test: Pre-Test Planning



- **Designate a Test Coordinator**

- Someone familiar with plant operations, previous testing, etc.
- Verify with test firm who's going to submit the Test Protocol- you or the test firm.
- What is the requirement for submittal...30, 45, 60 days prior to testing?

- **Review Process Operating Requirements**

- Establish process parameters required for testing program

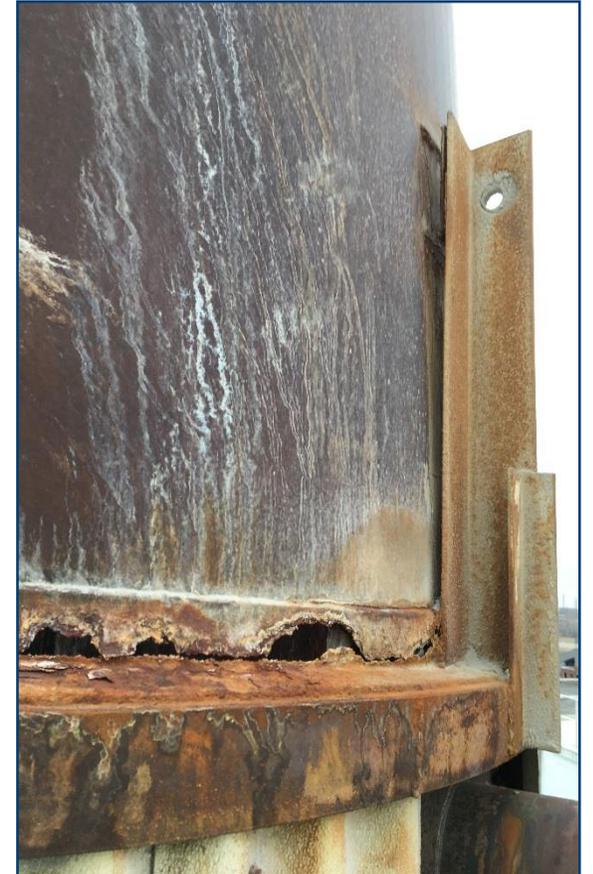
- **Coordinate Schedule with Plant Operations**

- Verify any known outages, unit availability, required support personnel



5. Conduct the Test: Pre-Test Planning

- **Coordinate calendar schedule with test firm**
 - Verify travel and setup day, first test day, number of test days, etc.
 - Relay safety training and PPE requirements to test firm
 - Any unique directions to access the plant, etc.
- **Test site preparation**
 - Verify location has proper safety guards in place
 - Verify power at location is working
 - Verify test ports have been recently loosened and cleaned
 - Will breathing air be required?



5. Conduct the Test: Pre-Test Planning

- **Test site preparation (cont'd)**
 - Safe access to test platforms
 - Man-lift needed? Has it been coordinated?
 - Elevators/hoist inspected and working
 - Is climbing gear required?



5. Conduct the Test: Test Firm Onsite

- **Schedule plant safety orientation for test firm on day of arrival**
 - Restrooms for test crew
 - Location of emergency care facility
- **Provide plant radio with designated channel, if needed**
- **Electrical power at test trailer**
 - Coordinate with test firm prior to determine test trailer voltage
 - Different test firms use different voltages and adaptor plugs
 - Have electrician support scheduled for test firm equipment set up day



PLAN HARD – TEST EASY!!

5. Conduct the Test: Testing Event



- Coordinate testing times for the following test day with test firm Project Manager
 - Test crew will be in 1-2 hours prior for final setup/leak checks, etc.
- Coordinate first test run with test firm, plant operations, and agency personnel
- Most test days will last 6-10 hours from the start of the first test run until the end of the last test run
 - Ensure a designated plant person is collecting operating data throughout the test day
 - This may include: Baghouse Pressure Drop ("H₂O), Raw Material Feed Rate (TPH). Drive Amps, Production Rate, Baghouse Inlet Temp (F), Fuel Feed Rate (TPH), Product Produced (High Calcium or Dolomitic)
 - Document any deviations from the Test Protocol as they will need to be noted in the Test Report



6. Report the Results

- Reporting starts as soon as testing has completed
- Provide field testing data onsite as needed to confirm emissions
- Discuss results expectations and if “RUSH” analysis results are required
- Document all samples and analysis required in the Chain of Custody form



TRC
Chain of Custody Record 8804714

Project Name: Columbia Energy Center
Site Name: Columbia Energy Center

Sample ID	Sample Description	Sample Location	Sample Date	Sample Time	Sample Volume	Sample Matrix	Sample Status	Sample Notes
2880	Unit 2 SO2 Inlet Dust	NCASD Method BA - 40 South - CI	10/12/2018	1:00	1.0	Condensate water mist (200 ml)	✓	
2881	Unit 2 SO2 Inlet Dust	NCASD Method BA - 40 South - CI	10/12/2018	1:05	1.0	Condensate water mist (200 ml)	✓	
2882	Unit 2 SO2 Inlet Dust	NCASD Method BA - 40 South - CI	10/12/2018	1:10	1.0	Condensate water mist (200 ml)	✓	
2883	Unit 2 SO2 Inlet Dust	NCASD Method BA - 40 South - CI	10/12/2018	1:15	1.0	Condensate water mist (200 ml)	✓	
2884	Unit 2 SO2 Inlet Dust	NCASD Method BA - 40 South - CI	10/12/2018	1:20	1.0	Condensate water mist (200 ml)	✓	
2885	Unit 2 SO2 Inlet Dust	NCASD Method BA - 40 South - CI	10/12/2018	1:25	1.0	Condensate water mist (200 ml)	✓	
2886	Unit 2 SO2 Inlet Dust	NCASD Method BA - 40 South - CI	10/12/2018	1:30	1.0	Condensate water mist (200 ml)	✓	
2887	Unit 2 SO2 Inlet Dust	NCASD Method BA - 40 South - CI	10/12/2018	1:35	1.0	Condensate water mist (200 ml)	✓	
2888	Unit 2 SO2 Inlet Dust	NCASD Method BA - 40 South - CI	10/12/2018	1:40	1.0	Condensate water mist (200 ml)	✓	
2889	Unit 2 SO2 Inlet Dust	NCASD Method BA - 40 South - CI	10/12/2018	1:45	1.0	Condensate water mist (200 ml)	✓	
2890	Unit 2 SO2 Inlet Dust	NCASD Method BA - 40 South - CI	10/12/2018	1:50	1.0	Condensate water mist (200 ml)	✓	
2891	Unit 2 SO2 Inlet Dust	NCASD Method BA - 40 South - CI	10/12/2018	1:55	1.0	Condensate water mist (200 ml)	✓	
2892	Unit 2 SO2 Inlet Dust	NCASD Method BA - 40 South - CI	10/12/2018	2:00	1.0	Condensate water mist (200 ml)	✓	
2893	Unit 2 SO2 Inlet Dust	NCASD Method BA - 40 South - CI	10/12/2018	2:05	1.0	Condensate water mist (200 ml)	✓	
2894	Unit 2 SO2 Inlet Dust	NCASD Method BA - 40 South - CI	10/12/2018	2:10	1.0	Condensate water mist (200 ml)	✓	
2895	Unit 2 SO2 Inlet Dust	NCASD Method BA - 40 South - CI	10/12/2018	2:15	1.0	Condensate water mist (200 ml)	✓	
2896	Unit 2 SO2 Inlet Dust	NCASD Method BA - 40 South - CI	10/12/2018	2:20	1.0	Condensate water mist (200 ml)	✓	
2897	Unit 2 SO2 Inlet Dust	NCASD Method BA - 40 South - CI	10/12/2018	2:25	1.0	Condensate water mist (200 ml)	✓	
2898	Unit 2 SO2 Inlet Dust	NCASD Method BA - 40 South - CI	10/12/2018	2:30	1.0	Condensate water mist (200 ml)	✓	
2899	Unit 2 SO2 Inlet Dust	NCASD Method BA - 40 South - CI	10/12/2018	2:35	1.0	Condensate water mist (200 ml)	✓	
2900	Unit 2 SO2 Inlet Dust	NCASD Method BA - 40 South - CI	10/12/2018	2:40	1.0	Condensate water mist (200 ml)	✓	

Prepared By: [Signature]
Reviewed By: [Signature]

6. Report the Results



- Confirm that testing conformed to test plan requirements or explain any deviations
- Provide supporting process documentation
- Provide draft report to all interested parties by the requested date
- Discuss/explain quality control data
- Arrange for electronic reporting of data if required
- Document the test program results in a test report that conforms to the test plan and issue final report

2.0 SUMMARY OF RESULTS

The results of this test program are summarized in the table below. Detailed individual run results are presented in Section 6.0.

Unit ID	Emission Point	Pollutant Tested	Measured Emissions	Emission Limit
Kiln 3(EU-3)	Kiln Baghouse Exhaust Stacks (S-3A through S-3F)	Filterable Particulate (FPM)**	0.008 lb/tsf*	0.12 lb/tsf*
		Total Particulate (PM ₁₀)	0.070 lb/ton	0.478 lb/ton
			1.39 lb/hr	9.950 lb/hr
		VE	0% over 6-minute averages	Shall not exceed 10% over 6-minute averages
		VOCs	0.015 lb/ton of Lime**	0.06 lb/ton of Lime**

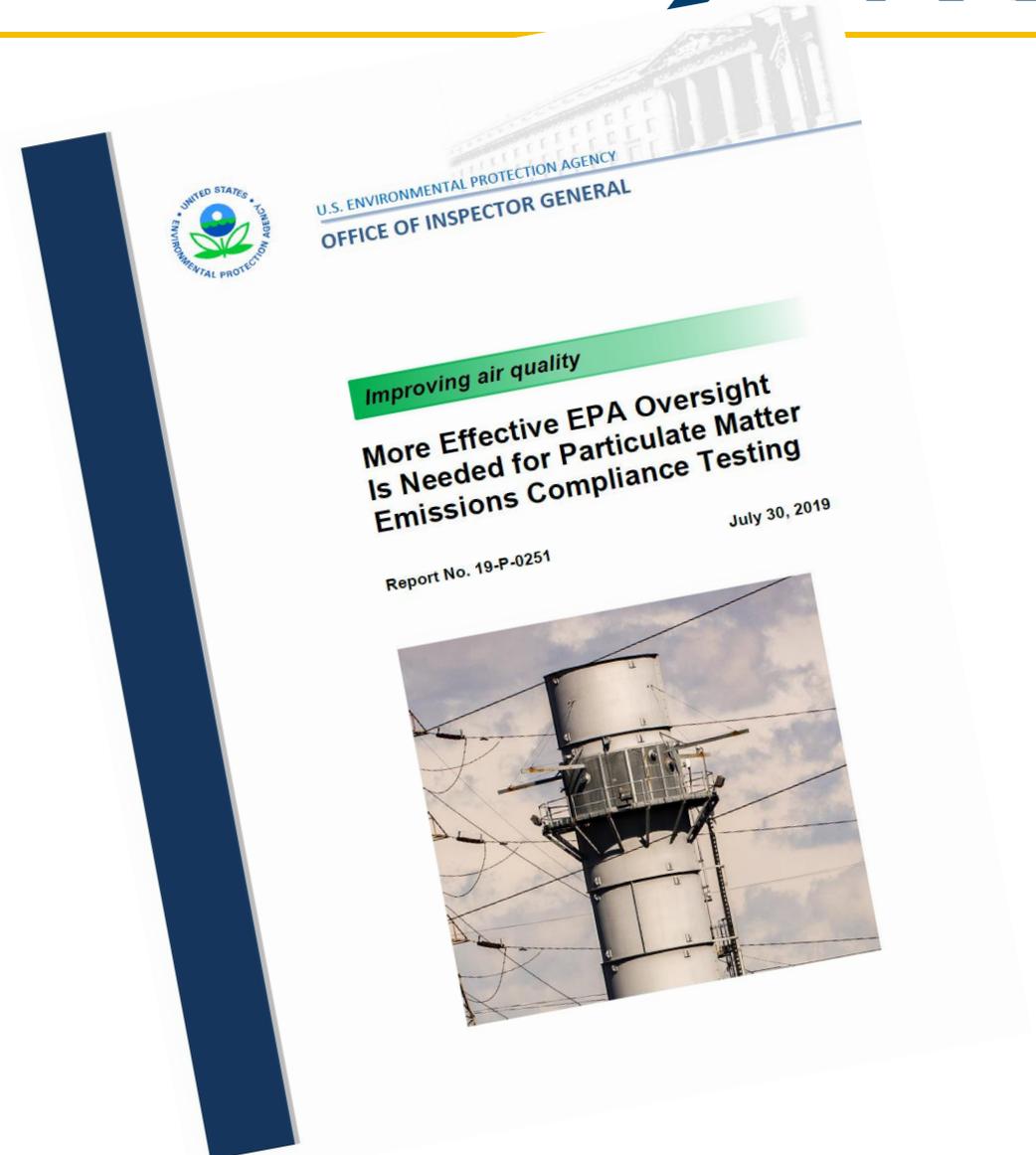
*FPM limits are reported in pounds per ton of stone feed.

Process Audit- EPA Assessment



EPA Audited PM Emission Reports (Report No. 19-P-0251)

- Reviewed 30 compliance reports in Washington State in July 2019
- Reinforced the importance of thorough planning and execution
- Found nonadherence to EPA test methods and inadequate supporting documentation
- Found inadequate State Agency oversight



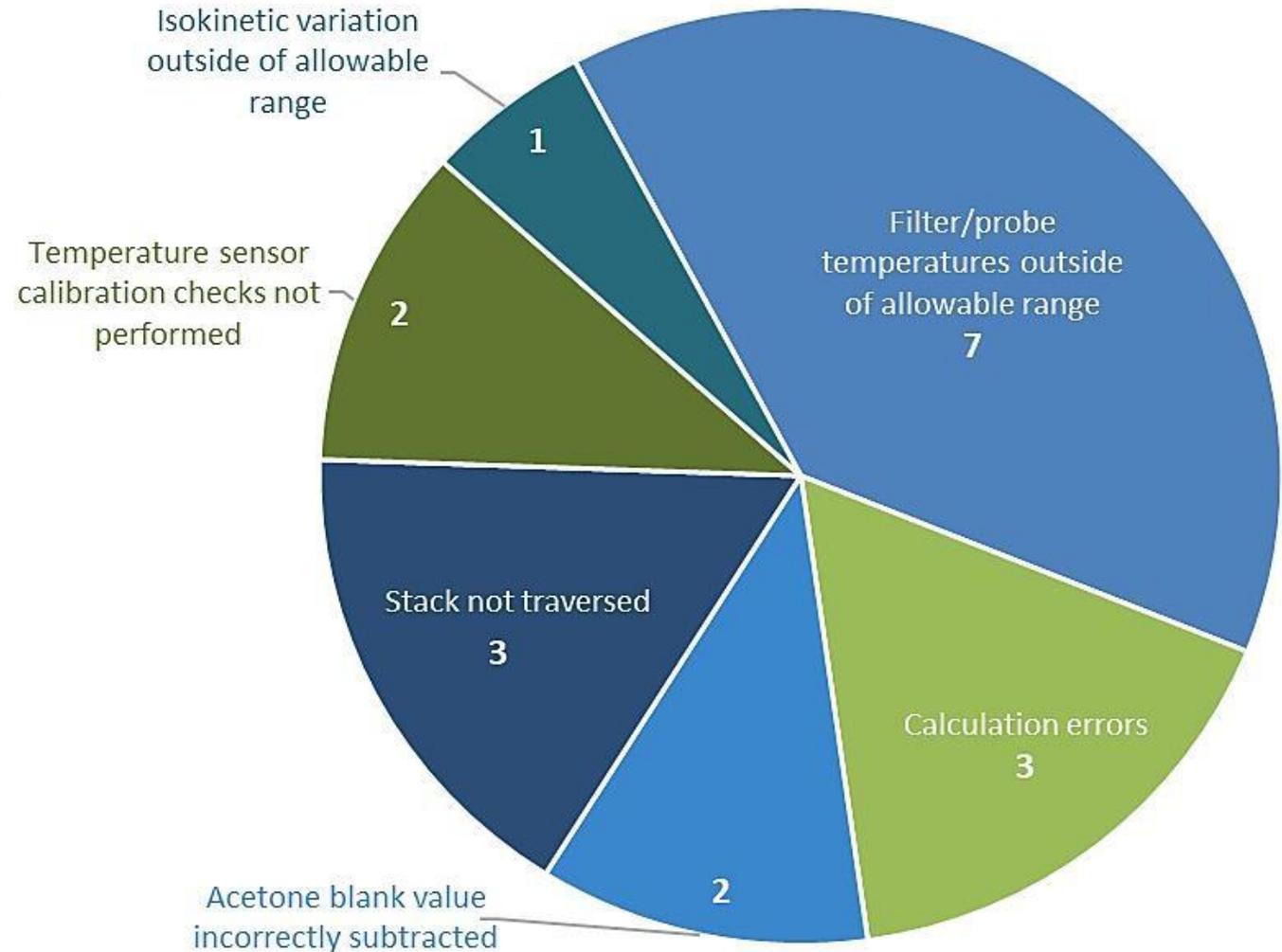
Process Audit- EPA Assessment



EPA Method Errors Identified

➤ *18 of 30 reports reviewed identified method errors*

- Filter/probe temperature outside range
- Calculation errors
- Blanks values incorrectly subtracted
- Stack not traversed
- Calibration checks not performed
- Isokinetic variation outside of range



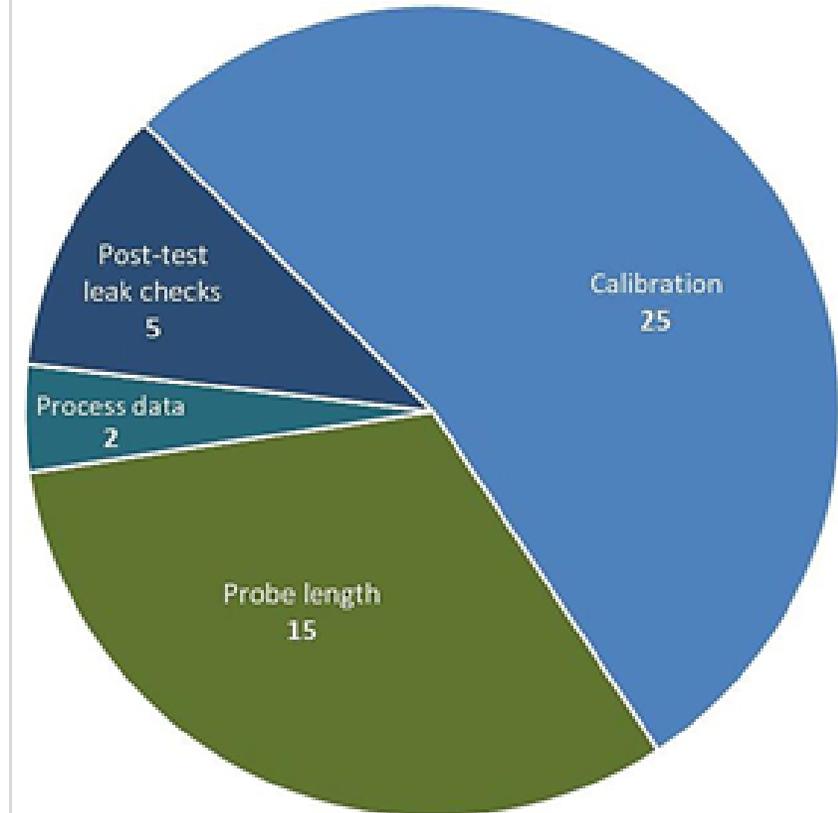
Process Audit- EPA Assessment

Missing Report Documentation

➤ *Of the 30 reports reviewed, 29 had missing data and 13 had multiple missing data*

- Calibration data
- Probe length
- Process data
- Post-test leak checks

Figure 5: Missing data and documentation



Source: OIG analysis of 30 stack test reports from Washington State Department of Ecology and five local clean air agencies.

Report Recommendation EPA Implement the Following Improvements:

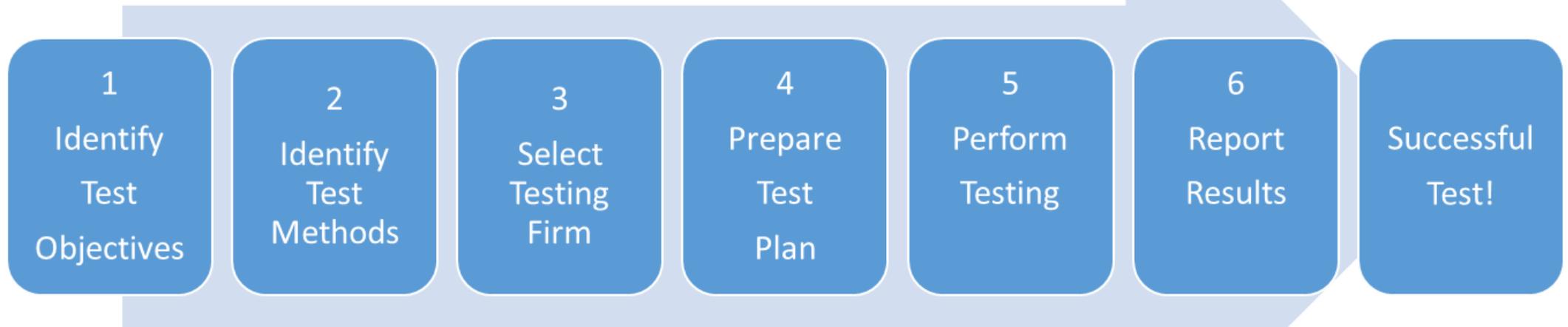


- Implement a plan for improving the consistency of stack test reviews.
- Assess and improve the training needs for stack test plans and report reviews and EPA test methods.
- Develop checklists for EPA Method 5 and other frequently used EPA methods for the reviews of stack test plans and reports.
- Publish a list of EPA contacts who can assist with stack test method issues or other stack test problems.
- Develop a communication plan to make staff aware of EPA requirements and guidance for conducting stack testing oversight.
- Implement controls to assess delegated agencies' stack testing oversight activities.

In Summary: Keys to Success



- Clear Objectives
- Proper Methods for Testing
- Appropriate Planning
- Accurate Reporting: Results You Can Rely On
- Communication Throughout the Project



Thank You

Questions?

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