

How To Survive a Technical System Audit

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Administrative

- Bathrooms
- Fire exits
- Breaks
- Handouts
- Sign In
- Cell Phones



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Introductions

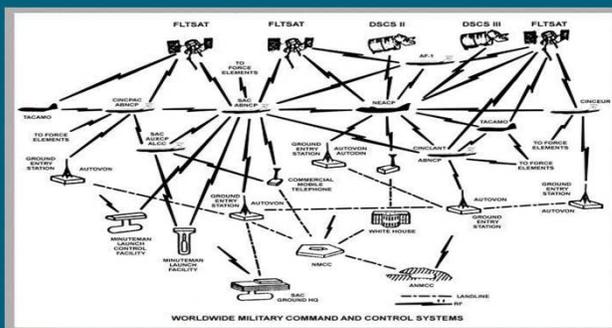
- Your name?
- District/workplace?
- How long?
- What role will you play with the TSA?
- What have you heard about TSA's?



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This is NOT the Military, BUT.....

- Command and control
- Standards and training



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Standards and Training



- How do you train every one to do the same thing the same way?

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Back to Air Monitoring and How California is Unique



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Today's Objectives

- Learn about the Primary Quality Assurance Organization
- Prepare you for a Technical System Audit (TSA)
- Understand common ambient air monitoring terminology

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Think of This Key Concept

- Measurement Uncertainty



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Primary Quality Assurance Organization (PQAO)

- 40 CFR Part 58 Appendix A
 - *Quality assurance requirements for SLAMS, SPM's, and PSD*
 - *Responsible for a set of stations that monitors the same pollutant and for which data quality assessments can logically be pooled.*

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PQAO Goals

- Homogeneous as a result of **COMMON** factors:
 - Operation by a common team of field operators according to a common set of procedures;
 - Use of a common QA Project Plan or standard operating procedures
 - Common calibration facilities and standards;
 - Oversight by a common QA organization; and
 - Support by a common management, laboratory or HQ.

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PQAOs in California



- ARB
- Bay Area AQMD
- South Coast AQMD
- San Diego APCD

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How Does the PQAO Benefit You?

- Training
- Audits/Collocated Samplers/Standards lab Services
- Quality Management Plans
- Quality Assurance Program Plans
- Data consistency/Measurement uncertainty
- Opportunities for cooperation/Program Efficiency
- Standardized Formal Documentation

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Acronym Underworld Test

- As part of the PQAQ CARB MLD QA will administer the TSA to review the MO AAM program!!!
- A TSA is not supposed to be punitive!!!
- Any questions on PQAQ?



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What's the Difference Between a Good Program and A Credible Program?



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Technical System Audit

- An on-site review and evaluation of a monitoring organizations AAM program to assess its compliance with established regulations.

Data:

- Collection
- Analysis
- Validation
- Reporting



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Critical Points

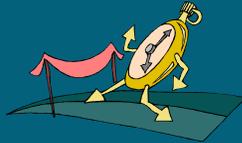
- Opportunity to learn/grow
- Improve data quality
- This not used to validate or invalidate data
- Ample time to prepare
- Criteria pollutants only
- Reduce measurement uncertainty



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Technical System Audit What to Expect

- Conference call
- Review questionnaire
- ARB can clarify questionnaire
- On-site evaluation
- In-depth written evaluation



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Conference Call

- Identify your key players
 - Invite key players to the conference call
 - Get team on board
- ARB will:
- Describe the process
 - Answer any questions
 - Suggest time-saving measures



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Next Step: TSA Questionnaire

Four Major Components

- General/Quality Management
- Network Management/Field Operations
- Laboratory Operations
- Data and Data Management



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General/Quality Management

- a) Program organization
- b) Facilities
- c) Independent quality assurance and control
- d) Planning documents (including QMP, QAPP's, & SOPs)

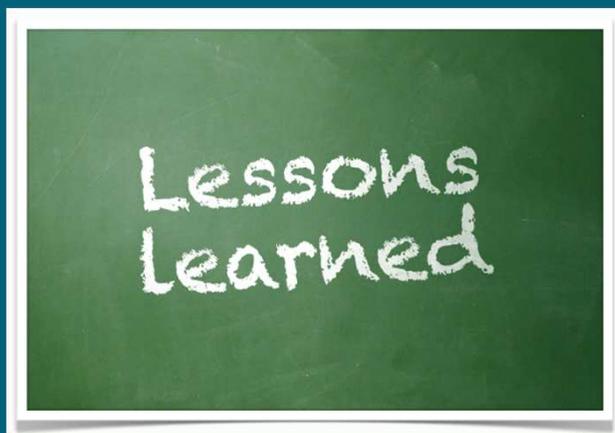
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General/Quality Management Cont.

- e) General documentation policies
- f) Training
- g) Corrective action
- h) Quality improvement
- i) External performance audits

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General/Quality Management



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Documentation: What You Do vs. What You Document



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Training

- Maintain a Training Plan
- Think about succession planning
- Attend training
- Document training
- Review and follow-up



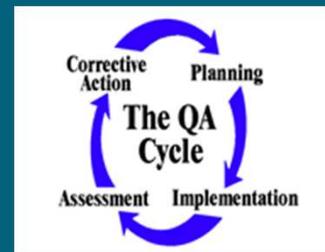
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Quality Assurance

- Quality assurance is a **management** or **oversight** function; it deals with setting policy and running an administrative system of management controls that cover planning, implementation, and review of data collection activities and the use of data in decision making.



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Quality Assurance vs. Quality Control

- QC is the overall system of technical activities that **measures** the attributes and performance of a process, item or service against a **defined standards** to **verify** that meet stated requirements by the end users.



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Calibration vs. Certification

- **Calibration** - comparison of a **measurement** standard of **higher accuracy** to detect and quantify inaccuracies and to report or eliminate those inaccuracies **by adjustment**.
- Normally carried out in the field
- Traceable to a standard



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Certification/Verification

- No adjustments made
- Traceability with a primary standard



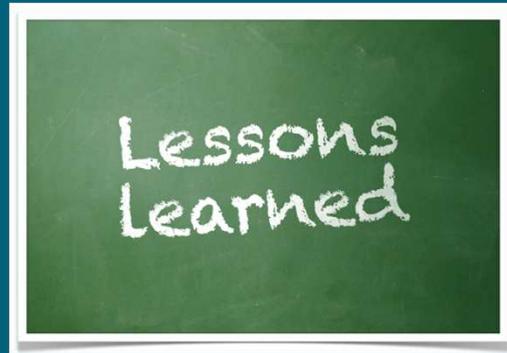
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Network Management/Field Operations

- Network design (40 CFR Part 58, Appendix D)
- Field support
 - SOP's
 - Instrument acceptance
 - Calibration
 - Repair
 - Site and monitor information

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Network Management and Field Operations



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Review Annual Requirements

- Annual Network Plan Review
- Site Maps (update and review)
- General Siting (40 CFR Part 58, Appendix E)
- Provide Documentation that Review has been Completed

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Laboratory Operations

- Routine operations
- Quality control
- Laboratory preventive maintenance
- Laboratory record keeping
- Laboratory data acquisition and handling
- Specific pollutants PM_{10} , $PM_{2.5}$, & lead

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Laboratory Operations



Lessons
Learned

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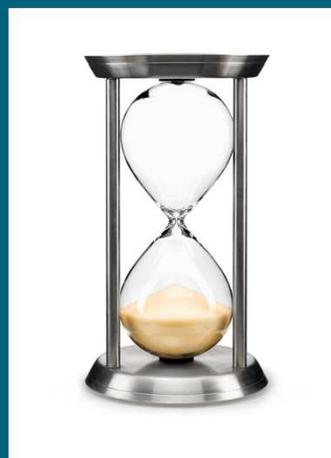
The Lab

- Documentation
- SOPs
- Certifications
- Logs



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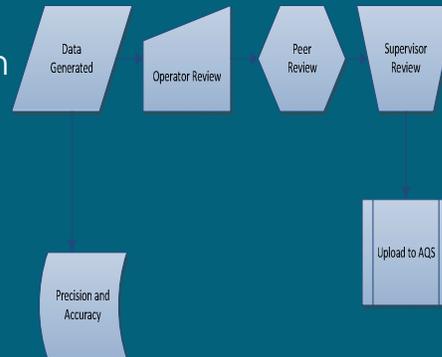
BREAK TIME



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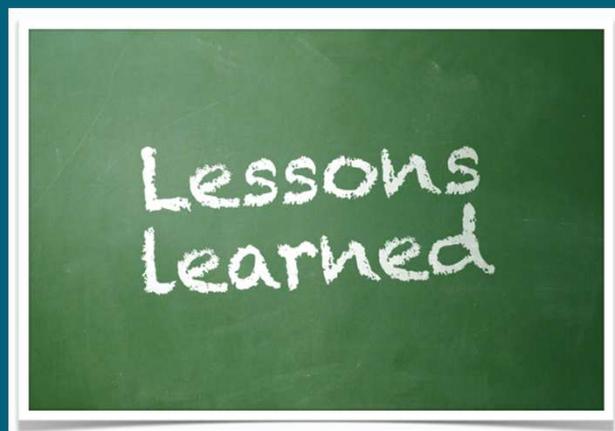
Data and Data Management

- Data handling
- Software documentation
- Data validation and correction
- Data processing
- Internal reporting
- External reporting



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Data Management



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Table 2-1 Measurement Quality Objectives for Ozone Developed into a Validation Template

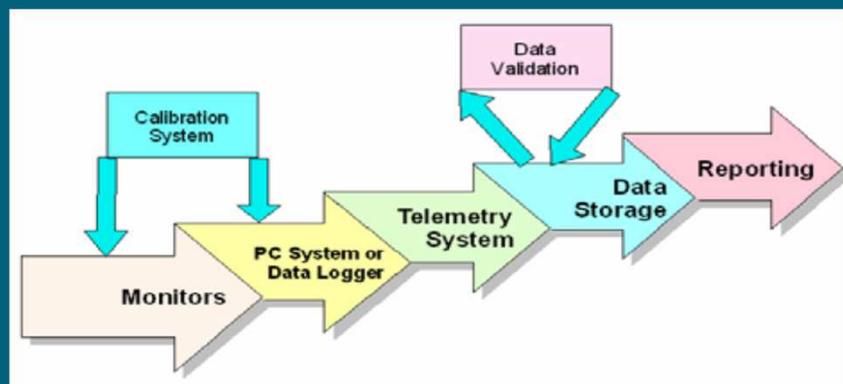
Requirement	Frequency	Acceptance Criteria
Critical Criteria		
One Point QC Check	1-2 weeks	< 1% (percent difference)
Single analysis		
Zero/span check	1-2 weeks	Zero drift = + 3% of full scale Span drift = + 1%
Operational Criteria		
Shelter Temperature		
Temperature range	Daily (hourly values)	20 to 30° C. (hourly ave) or per manufacturer specifications if designated to a wider temperature range
Temperature Control	Daily (hourly values)	+/- 2° C SD over 24 hours
Precision (using 1-point QC checks)	Calculated manually and as appropriate for design value estimates	90% CL CV < 5%
Bias (using 1-point QC checks)	Calculated manually and as appropriate for design value estimates	95% CL <= 1%
Annual Performance Evaluation		
Single analysis	Every site 1 year 25 % of sites quarterly	Percent difference at each audit level < 15%
PQAO	annually	95% of audit percent differences fall within the one point QC check 95% probability intervals at PQAO level of aggregation
Federal Audits (NPA)	1 year at selected sites 20% of sites audited	Mean absolute difference = 10%
State audits	1 year	State requirements
Calibration	Upon receipt/adjustment/repair and 1.6 months if manual zero/span performed bi-weekly 1 year if continuous zero/span performed daily	All points within +/- 1% of full scale of best fit straight line
Zero Air		Concentrations below LDC
Gasoline Standards		NIST Traceable (e.g. EPA Protocol Gas)
Zero Air Check	1 year	Concentrations below LDC
Ozone Transfer standard	1 year	
Qualification and certification	Upon receipt of transfer standard	±1% or ±1 ppb (whichever greater)
Reimbursement to local primary standard	Beginning and end of OS season or 1.6 months whichever less	RSD of six slopes = 3.5% Std. Dev. of 6 intercepts = 1.5 New slope = -0.01 of previous
Ozone local primary standard	1 year	single point difference = ±1 % (preferably ± 3%)
Certification/reimbursement to Standard Fluorometer	1 year	Regression slopes = 100 ± 10% and two intercepts are 0 ± 3 ppb
If certified to a metric standard		
Detection	NA	0.05 ppb
Notes		
Systematic Criteria		
Standard Reporting Units	All data	ppm (final units in AQIS)
Compliance (seasonal)	Daily	75% of hours average for the 1 hour period < 30 seconds
Sample Residence Times		< 30 seconds
Sample Probe, Inlet, Sampleline type		Fyres Glass or Teflon

Data Management Cont.

(Section 3 Page 6)

- **Critical Criteria-**
 - Critical to maintaining the integrity of a sample
 - Should be invalidated unless there are compelling reason and justification for not doing so
- **Operational Criteria Table-**
 - Maintaining and evaluating the quality of the data collection system.
 - Violation of criteria may be cause for invalidation.
 - The reason for not meeting the criteria should be investigated, mitigated or justified.
- **Systematic Criteria Table-**
 - Does not usually impact the validity of a sample or group of samples.

Data Management



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Data Verification vs. Validation

- **Verification** - process of evaluating completeness, correctness, and compliance of a data set against specified requirements.
- **Validation** is an analyte- and sample-specific process that extends data verification to determine the analytical quality of a specific data set.

- <http://www.epa.gov/quality/qs-docs/g8-final.pdf>

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Corrective Action Plan

- Have a plan available
- Think flow chart
- When is corrective action required?
- Why is correction action required?
- Who sees and approves the corrective action?
- Who conducts the corrective action?

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Corrective Action Steps

- Identify a problem (anomaly, deviation, deficiency)
- Determine source(s) of the problem
- Assess impact on operations/data
- Develop a corrective action plan
- Implement corrective action
- Document completed corrective action
- Verify effectiveness of implemented action

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Hints for Completing the Survey



- Make time
- Plan who you need to meet with
- Be organized
- Answer questions that do not apply with a "N/A"



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Hints for Completing Survey cont.

- Don't leave blanks in the questionnaire
- If you don't know the answers, it's okay, refer to QA Volume II, call or email for clarification, or answer "don't know."



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Next Step: ARB's Review

- TSA Questionnaire Responses
- Performance Audit Results
- Air Quality Data Actions (AQDAs)
- AMP 250, 255, and 430 reports from AQS
- Annual Network Monitoring Plan
- Trend data (last 3-12 months) for gaseous parameters

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ARB's Review Cont.

- Will formulate list of areas requiring clarification or additional information
- Will provide a list of documents/requirements for the on-site visit.



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Next Step: On-Site Visit

- Conduct interviews of key staff
 - Describe daily activities
 - Describe support and administrative staff
 - Peer review process
 - Back up personnel
 - Training attended
- Review documentation and process
- Summary Reports

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On Site Visit Cont.

- Records Retention Schedule Plan
- Data Storage and Back Up
 - Explain and Demonstrate
- List of Equipment
 - Analyzers
 - Flow Instruments
 - Calibration Devices
 - Flow Devices
 - Meteorological Equipment

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Prep for ARB's Visit

- Have your team there and available for interviews
- Reserve a room
- Have a list of SOP's available
- Be prepared to visit a station/mass analysis lab



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Written Evaluation

- ARB will provide a draft written evaluation
- You will have an opportunity to comment on the draft.
- Provide implementation timeline for recommendations
- Final evaluation will take into consideration your comments



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Useful Resources

- EPA Quality Assurance Handbook Volume II
 - <http://www.epa.gov/ttn/amtic/files/ambient/pm25/qa/QA-Handbook-Vol-II.pdf>
 - Section 15 ~ Assessment and Corrective Action
 - Appendix H ~ TSA Questionnaire
- ARB Quality Assurance Manual
 - <http://www.arb.ca.gov/aaqm/qa/qa-manual/qa-manual.htm>
- Air Monitoring Web Manual
 - <http://www.arb.ca.gov/airwebmanual/index.php>
- Standards Laboratory
 - <http://www.arb.ca.gov/aaqm/qa/stdslab/stdslab.htm>

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Questions?

- Evaluation Form
- Future training ideas?



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Group Exercise



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