NEMC 2021

Implementing ISO 17025 at an Oil Refinery

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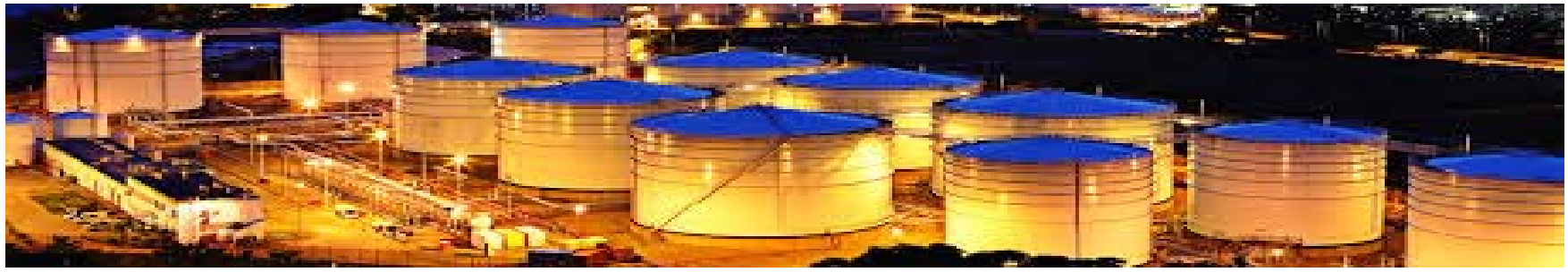
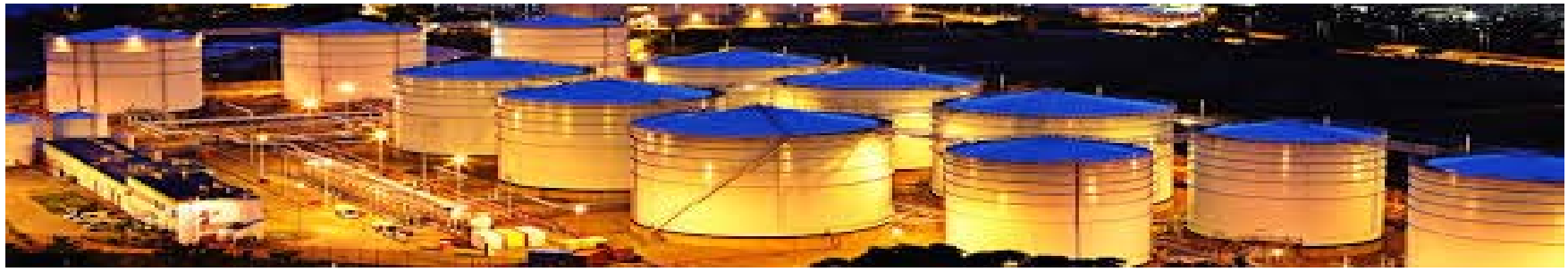


Introduction

- Quality Framework
- Describe Monitoring System
- Organization of Project
- Tasks performed
  - How
  - By who
- QA and validation

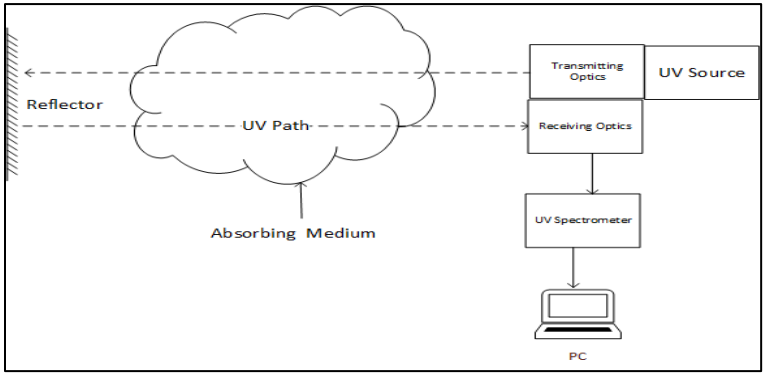
ISO 17025

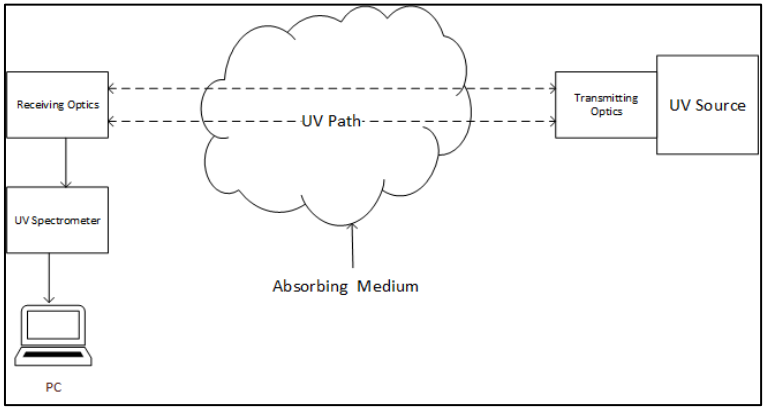
- General requirements for competence for testing and calibration laboratories
  - Covers:
    - Standard methods
    - Non-standard methods
    - Laboratory developed methods
  - Traceability to Primary Standard (NIST)
  - Execute method in a consistent manner
  - Continually improve



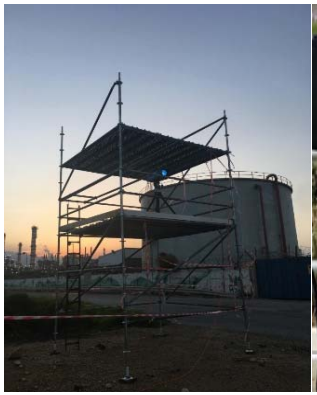
UV Method

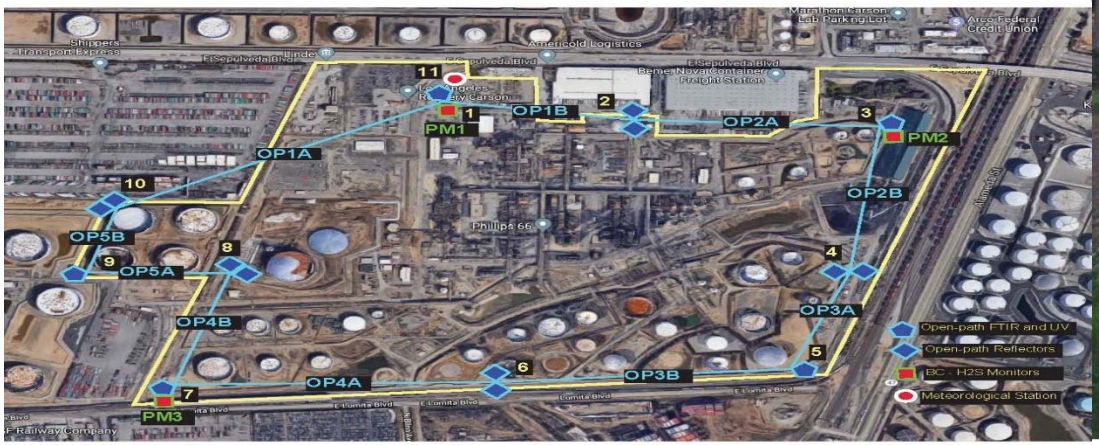
- The system should be capable of making spectral absorption measurements along an open-air optical path.
- The system must be able to produce and save a single beam spectrum.
- The system must be able to operate at 0.14 nm wavenumber resolution over the range 185 to 300 nm.
- The system must be capable of acquiring data by co-adding individual, single-beam scans in single-scan increments. At a minimum, the system must be able to co-add single beam spectrums, so that a five-minute average can be obtained.
- The system must have a mechanism where a gas cell of a known concentration can be installed in the UV path, so that the entire beam passes through the cell.





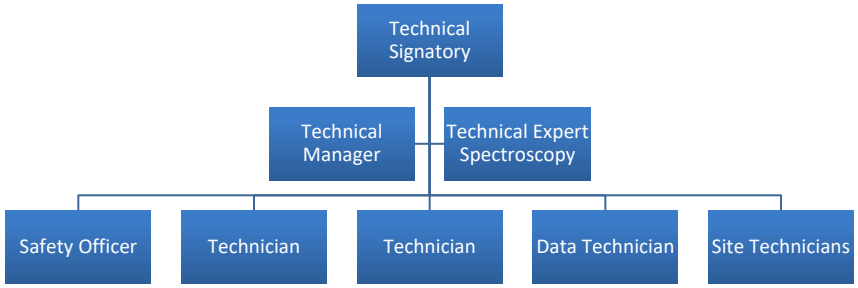
Open Path System: Field Laboratory



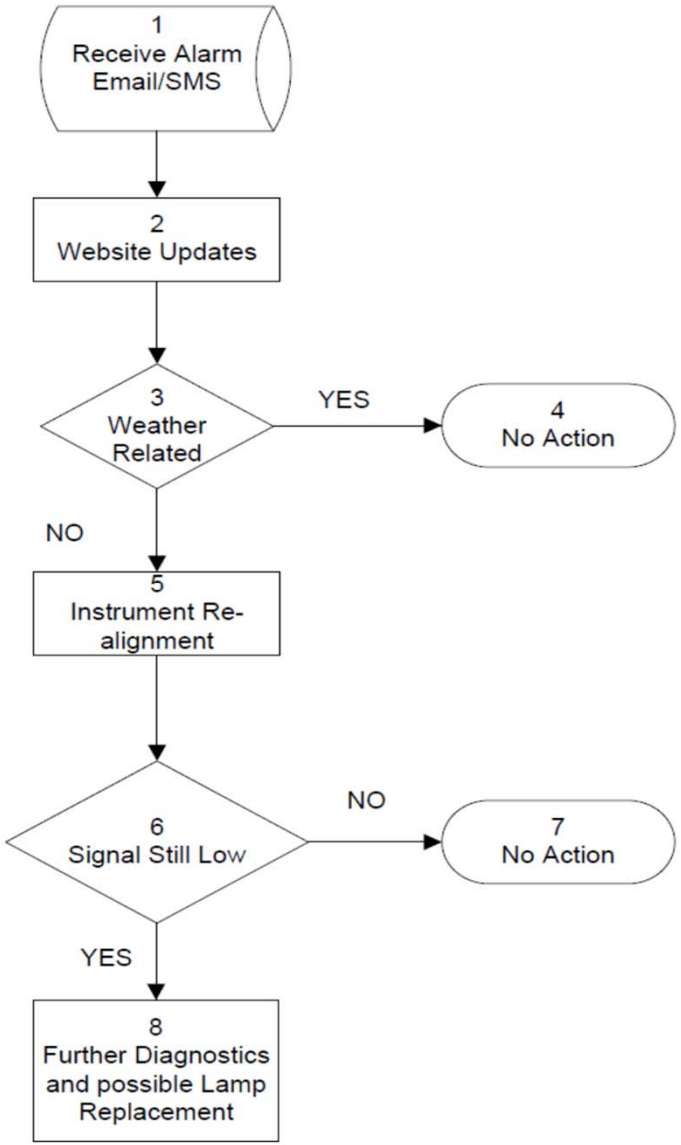


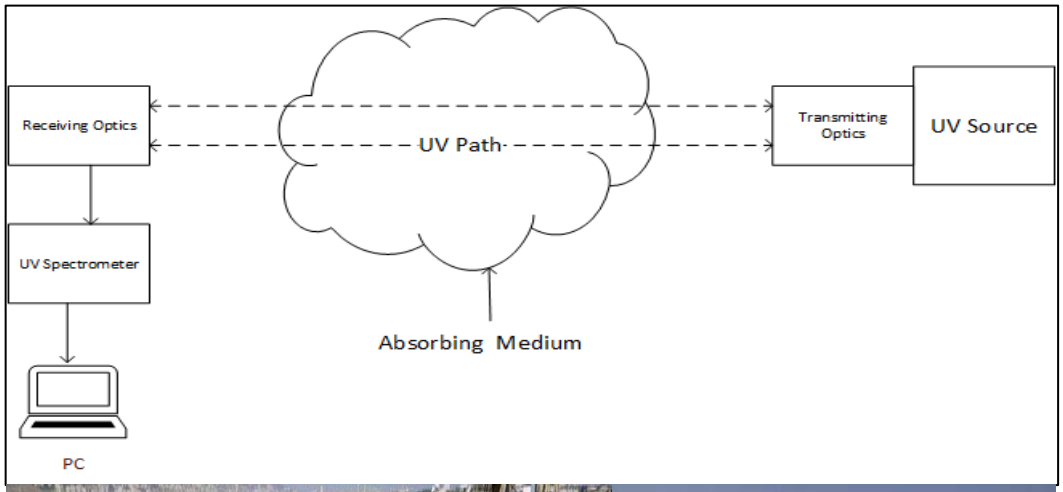
Project Organization

- Make sure the system is operating within its parameters (Level 0).
- Validate system detects and perform single point QA checks (Level 1).
- Validate the method (US EPA 301) (Level 2).
- Validate the data (Level 2)
- Service and maintain the equipment (Level 3).
- Conduct final Data Validation (Level 3).



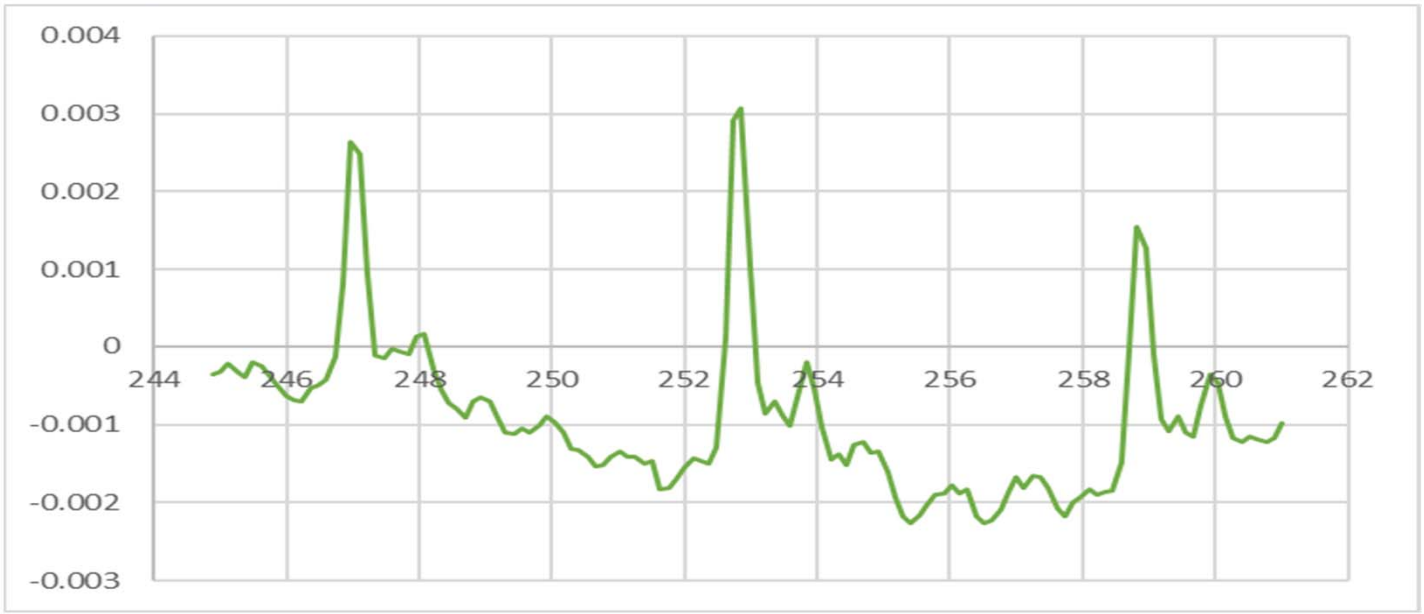
Low Signal Alarm Response (Level 1)





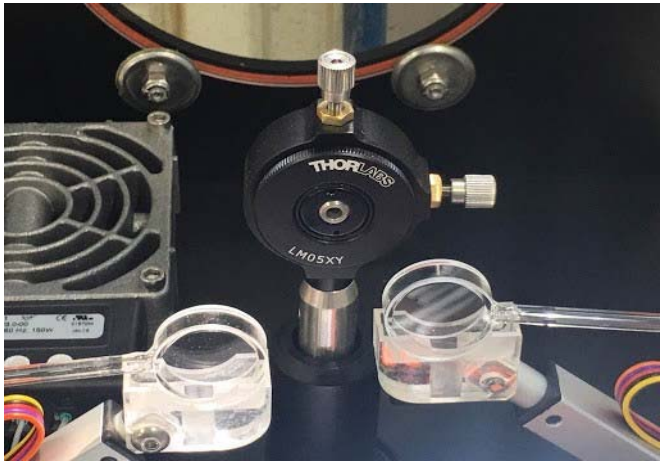
Manual Validation of Data (Level 1)

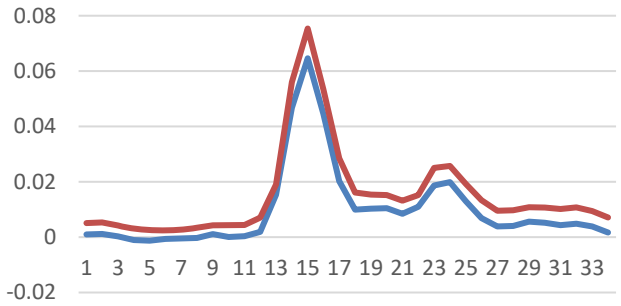
1. Manual Validation
2. LogMeIn and Copy Files
3. Data Summary Analysis
4. Locating Files
5. Relocating relevant data
6. Perform Log of data
7. Create Graph
8. Compare to Reference
9. Decision



Traceability (Level 2)

- Create reference spectra using reference system.
- Fill sealed cells with gases for field spiking.
- Validate concentration of cell with reference system.
- Validate concentration of cell in the field.





Verification and Validation Model

Parameter	Method Acceptable	Site-specific Method Acceptable	Unacceptable
Relative Bias	<= 10%	Between 10% and 30%	> 30%
Precision	Relative Standard Deviation (RSD) <=20%		RSD > 20%
MDL	N/A	N/A	N/A
Accuracy	<= 15%		> 15%
Linearity	R^2 >= 0.9		R^2 < 0.9
Robustness Temperature	<= 1%		> 15%
Robustness Signal Strength	<= 15%		> 15%
Robustness Sample Time	<= 15%		> 15%

Results

Parameter	Value	Status
Relative Bias	2% over 5 systems	Method Acceptable
Precision	1.9% over 5 systems	Method Acceptable
MDL	0.475	< 0.9
Accuracy	5%	Method Acceptable
Linearity	0.92	Method Acceptable
Robustness Temperature	3% from 9 to 45 deg C	Method Acceptable
Robustness Signal Strength	0.74%	Method Acceptable
Robustness Sample Time	10% from 0.5 min to 30 min	Method Acceptable

Tasks: Level 3

Check Type	Check	Frequency	Reference Doc	Roles and Responsibilities
Level 3				
Instrumentation	Annual service FTIR, UV and OGD	Annual	FLM-QLT-SOP-005 for Planned Maintenance, Critical Spares Tracking List	Technical signatory
Instrumentation	Certification system brought to factory spec	Annual	FLM-QLT-SOP-014 Monthly Reporting	Technical signatory
Data	Full reconciliation of data	Monthly	FLM-QLT-SOP-014 Monthly Reporting	Technical signatory
Data	Supervisor check for data trends	Monthly	FLM-QLT-SOP-014 Monthly Reporting	Technical signatory
Program	Complete system audit	Annual	Internal Audit Plan	Technical signatory
Program	Program evaluation and upgrade	Annual	Annual Management Review	Quality Manager

Project Achievements

- Continuous Improvement
  - Automate Manual Validation of Data
  - Data used to track leaks
- More frequent MDL
- ISO 17025 accreditation for 4 sites

Areas of Improvement

- Proficiency testing
- More frequent MDL
- Lower detection limits
- Expanding accreditation to other sites